PROGRAM

September 13
Reception

19:00 **Welcome cocktail.**

Monday, September 14
Starformation and evolution in dwarf galaxies

Chairman — Tully B.

9:00-9:10 **Opening Talk**
Balega Yuri

9:10-9:40 **H-alpha imaging survey of galaxies within 10 Mpc**
Karachentsev Igor and Kaisin Serafim

9:40-10:10 **Star formation at z=1 in nearby galaxies**
Prugniel Philippe

10:10-10:40 **Planetary Nebulae and HII regions as probes of the evolution of Local Group galaxies**
Kniazev Alexei

10:40-11:10 **Age and metallicity of two dwarf spheroidal galaxies in the Cen A group**
Makarova Lidia and Makarov Dmitry

11:10-11:40 **Coffee-break**

11:40-12:10 **Mixing of metals in blue LSB galaxies**
Shchekinov Yuri

12:10-12:40 **The Star Formation History of Dwarf Irregular KKH 98 Revealed by the Optical - IR Colors and Magnitudes of IR-Luminous Stars**
Melbourne Jason

12:40-13:00 **Star formation in extremely faint Local volume dwarf galaxies**
Roychowdhury Sambit

13:00-14:30 **Lunch**

Chairman — Karachentsev I.

14:30-15:00 **Dust evolution as seen from the nearby Universe**
Galliano Frederic

15:00-15:30 **Globular clusters as building blocks of galaxies**
Sharina Margarita

15:30-15:50 **Studying the dust properties of dwarf galaxies at submm wavelengths with LABOCA**
Galametz Maud

15:50-16:30 **Coffee-break**

16:30-17:00 **Formation and evolution of early-type dwarf galaxies: what can we learn from internal kinematics and stellar populations?**
Chilingarian Igor

17:00-17:20 **Decay of OB associations and evolution of dwarf galaxies**
Kurbatov Evgeny

17:20-17:40 **Chemical evolution of NGC147 and Fornax dwarf galaxies: the merger scenario**
Nykytyuk Tetyana

19:00 **Dinner**

Tuesday, September 15
Dwarf galaxy cosmology related issues

Chairman — Disney M.

9:00-9:30	**Galaxy Groups as Defined by the Distribution of Dwarf Galaxies** Tully Brent
9:30-10:00	**The dark matter distribution in dwarf galaxies: a contribution to the cusp-core discussion** Dettmar Ralf-Juergen
10:00-10:30	**Study evolutionary status of dwarfs in the nearby Lynx-Cancer void** Pustilnik Simon, Tepliakova Arina and Kniazev Alexei
10:30-11:00	**Studying dark energy with the nearby dwarf galaxies** Chernin Artur
11:00-11:30	**Coffee break**
11:30-12:00	**Local Cosmology from Isolated Dwarf Galaxies** Drozdovsky Igor
12:00-12:30	**Cosmic Flows and the skeleton of the Local Universe** Courtois Helene
12:30-13:00	**Sizes of minivoids in the Local Volume: another LCDM-overabundance Possible solutions** Tikhonov Anton
13:00-14:30	**Lunch**

Chairman — Kniazev A.

14:30-14:50	**Probing dark matter halos of galaxies through dwarf galaxies** Yegorova Irina
14:50-15:10	**The stellar content of I Zw 18: constraints from synthetic color-magnitude diagram modelling** Yakobchuk Taras
15:10-15:30	**Ionization composition of dwarf galaxies** Vasiliev Evgenii
15:30-16:30	**Poster session**
16:45	**Excursion to the ancient Alan city (Depends on weather)**
19:00	**Dinner**

Wednesday, September 16
Morphological diversity of dwarf galaxies and relation to large scale structure

Chairman —Chengalur J.

9:00-9:30	**Fresh views of enigmatic dwarf galaxies in the nearby universe** Lee Myung Gyoon
9:30-10:00	**Dwarf lenticular galaxies in groups: structure and evolutionary census** Sil'chenko Olga
10:00-10:30	**Low Surface Brightness Dwarf Galaxies in the General Field** Karachentseva Valentina, Sharina Margarita and Shipova Ksenia
10:30-11:00	**Unveiling NGC 205: a galaxy undergoing morphological transformation?** Saviane Ivo
11:00-11:30	**Coffee break**
11:30-12:00	**Faint Low Surface Brightness Galaxies in the Virgo Cluster** Davies Jonathan
12:00-12:20	**Dwarf galaxies in the Canes Venatici Cloud** Uklein Roman, Makarov Dmitry and Makarova Lidia
12:20-12:40	**Cosmic Flows - Playing with Data** Bonhomme Nicolas
12:40-14:30	**Lunch**
15:00-18:00	**Excursion to the 6-m telescope**
19:00	**Dinner**

Thursday, September 17
Gas in dwarf galaxies

Chairman —Davies J.

9:00-9:30	**FIGGS: The Faint Irregular Galaxy GMRT Survey** Chengalur Jayaram N.
9:30-10:00	**Dwarf galaxies found in blind HI surveys** Disney Michael
10:00-10:30	**The ionized gas kinematics in dwarf galaxies: 3D spectroscopic study** Moiseev Alexei
10:30-10:50	**The structure and kinematics of gas in the center of recent star-formation burst in the Irr Galaxy IC10** Egorov Oleg, Lozinskaya Tatiana and Moiseev Alexei
10:50-11:20	**Coffee break**
11:20-13:00	**Final discussion**
13:00-14:30	**Lunch**
15:00-18:00	**Excursion to RATAN-600**
19:00	**Conference dinner**

Friday, September 18
Arkhyz + barbecue (shashlik)

Posters:

1. **Egorov O.V., Lozinskaya T.A. and Moiseev A.V.**
   Metallicity of ionized gas in the Irr galaxy IC10

2. **Galliano F.**
   The very peculiar mid-IR properties of dwarf galaxies

3. **Kaisina E.I.**
   Observational Database for exploring the Local Universe

4. **Karachentsev I.D. and Nasonova O.G.**
   Blueshifted dwarf galaxies in the Virgo cluster

5. **Karataeva G.M., Sharina M.E. and Il'ina E.A.**
   Surface brightness profiles of Galactic star clusters imaged by SDSS.

6. **Kopylova F.G. and Kopylov A.I.**
   Red-sequence dwarf galaxies in clusters.

7. **Kurbatov E.**
   Constraints on star formation law for dSph galaxies

8. **Pustilnik S.A., Moiseev A.V. and Kniazev A.Y.**
   Ionized-gas kinematics in very metal-poor dwarf galaxies and implications for star formation triggers

9. **Ryabova M.**
   The modelling of mass-metallicity relation for dwarf spheroidal galaxies

10. **Tepliakova A.L. and Pustilnik S.A.**
    Pairs, groups and filaments of dwarf galaxies in the nearby Lynx-Cancer void as a reflection of void Dark Matter distribution

11. **Tikhonov N.A., Kuchaeva E.Yu. and Galazutdinova O.A.**
    The expansion of disk galaxies.

12. **Tikhonov N.A. and Galazutdinova O.A.**
    The new distance to IC342.

Cosmic Flows - Playing with Data

Bonhomme N.

Institut de Physique Nucleaire de Lyon, France

Using the Tully-Fisher relation, we can understand the motion of the galaxies in the local universe. I will show how we can get the peculiar velocity of the galaxies playing with HI and photometric data.

FIGGS: Faint Irregular Galaxies GMRT Survey

Chengalur J.N. and Begum A.

National Centre for Radio Astrophysics, Tata Institute of Fundamental Research, Pune, India

Observations of the atomic interstellar medium (ISM) of faint dwarf galaxies, i.e. its morphology, kinematics and spatial correlation with other galaxy components is particularly useful for improving our understanding of the processes related to galaxy formation and evolution. In the context of hierarchical galaxy formation models, dwarf galaxies are thought to be the building blocks for the assembly of more massive galaxies. As some of the most unevolved systems in the low redshift universe, observations of these galaxies are hence relevant in a range of cosmological contexts, ranging from testing predictions of cold dark matter models, to understanding the host populations of quasar absorption line systems and GRBs. Further, dwarf galaxies also provide unique sites for understanding star formation in extreme environments, with unusually low metallicity and dust content, low pressure, low shear, and low escape velocity. We discuss these issues in the specific context of a recent GMRT based HI imaging study of faint dwarf galaxies - the Faint Irregular Galaxies GMRT Survey (FIGGS). The primary goal of FIGGS is to obtain high quality observations of the atomic ISM for a large, systematically selected sample of faint, gas rich, dwarf irregular (dIrr) galaxies.

Studying Dark Energy with the Nearby Dwarf Galaxies

Chernin A.D.

Sternberg Astronomical Institute, Moscow State University, Russia

HST high accuracy data obtained by Karachentsev et al. on the distances and velocities of the nearby dwarf galaxies are used to constrain the local density of dark energy on the spatial scale of a few Mpc. It is demonstrated that the local density is approximately, if not exactly, equal to the dark energy density measured at the largest cosmological distances of $\sim$1000 Mpc. This is an independent evidence for the dark energy physics as described by Einstein's cosmological constant.

Formation and Evolution of Dwarf Early-Type Galaxies: what Can We Learn from Internal Kinematics and Stellar Populations?

Chilingarian I.V.

Observatoire de Paris-Meudon, France
Sternberg Astronomical Institute, Moscow State University, Russia

I will present recent results on Virgo dE/dS0s obtained from the analysis of (mostly archival) high-quality long-slit and 3D spectroscopic datasets from intermediate-size and large telescopes. A full spectral fitting technique was applied in order to extract stellar population properties and absorption-line kinematics out to 1–2 effective radii for several dozens of galaxies. These are the first published stellar population profiles for a large sample of early-type dwarfsormation and evolution of dwarf early-type galaxies: what can we learn from internal kinematics and stellar populations? Fainter dE/dS0s having intermediate ages and metallicities between –0.8 and –0.2 dex look consistent with the external channel of dE formation, i.e. ram-pressure stripping and gravitational harassment. At the same time, brighter galaxies ($M_B = -17.5 \ldots -16.5$) look remarkably similar to intermediate-mass and giant lenticulars and ellipticals: (1) their nuclei often harbour young metal-rich stellar populations always associated with the drops in the velocity dispersion profiles; (2) metallicity gradients in the main discs/spheroids vary significantly from nearly flat profiles to –0.8 dex per r_e, i.e. somewhat 3 times steeper than for typical bulges; (3) kinematically-decoupled cores were discovered in 3 galaxies including two with very little, if any, large scale rotation. These results suggest similarities in the evolutionary paths of dwarf and giant early-type galaxies and call for reconsidering the role of major mergers and secular evolution in the evolution of dwarf galaxies.

Cosmic Flows and the Skeleton of the Local Universe

Courtois H.

Institut de Physique Nucleaire de Lyon, France

The goal of the "Cosmic Flows" program is to obtain the densest and deepest possible coverage of galaxy distances and, hence, of line-of-sight peculiar velocities. We want to improve the local determination of the Hubble Constant and measure departures from the cosmic expansion that presumably can be attributed to the distribution of matter. We are giving consideration to 7–10 different methods for deriving distances. One of these relies on the correlation between galaxy luminosities and rotation rates, so called Tully-Fisher relation. We have acquired from our own observations and from digital archives, and re-measured more than 16,000 HI spectra, for about 12,500 spiral galaxies in the local universe. I will present the dynamic maps that are currently drawn from this data. Those cosmic flows lead to a better understanding of the density and distribution of Luminous Matter, Dark Matter, and eventually to the local Dark Energy density.

Faint Low Surface Brightness Galaxies in the Virgo Cluster

Davies J.

Cardiff University, UK

We have used the INT WFC to obtain deep images of about 22$\square^\circ$ of the Virgo cluster region and about 30 $\square^\circ$ of an off-cluster comparison field along the celestial equator. We have then used a template matching algorithm to objectively select faint low surface brightness objects. The most striking result is the large numbers of faint low surface brightness objects that are found in the Virgo fields, but not in the off-cluster field. There appears to be large numbers of faint diffuse low luminosity galaxies in the cluster that do not reside in the field. We discuss the implications with regard to the galaxy luminosity function, evironmental effects within galaxy clusters and galaxy formation theories.

The Dark Matter Distribution in Dwarf Galaxies: a Contribution to the Cusp-Core Discussion

Dettmar R.J.

Ruhr-University Bochum Astronomical Institute, Germany

In order to model the distribution of dark matter in dwarf galaxies the HI velocity field of six dwarf galaxies has been analyzed. The harmonic decomposition used insures a proper consideration of velocity contributions introduced by non/circular motions. It is shown, that in all cases studied the resulting "isothermal" model describes the mass distribution better than the NFW profile.

Dwarf Galaxies Found in Blind HI Surveys

Disney M.

Cardiff University, UK

Local Cosmology from Isolated Dwarf Galaxies

Drozdovsky I.O.

Instituto de Astrofisica de Canarias, La Laguna, Spain

Given the many recent advances in our understanding of the star formation history (SFH) of the Local Group (LG) and other nearby galaxies, and in the evolution of star formation with redshift, we present an updated comparison of the comoving space density of the star formation rate as a function of look-back time for the Local and Distant Universe. The Local SFH is derived from analysis resolved stellar populations ("fossil records") in individual nearby galaxies, based on our own estimations as well as available in the literature. While the preliminary comparison of SFHs is found to be broadly consistent, the detailed discrepancies still remain, including excess of the Local star formation rate density in the most recent epoch. While the recent episodic star formation activity is observed in dwarf galaxies, most dwarfs in the Local Group are also dominated by the old stellar populations with no apparent evidence for the "downsizing" effect in the galaxy evolution. The overall trend of star formation density from the LG supports a fairly flat evolution of the SFR without showing the turnover implied by the Lyman dropout measurements. This suggests factors of $\sim$10 extinction correction to high-redshift UV-based measures. However, while the Local Group is a fairly representative sample of the local mean, an extension of "fossil records" studies to at least of 5 Mpc radius sphere will provide a more robust comparison of the Local and Cosmic evolution.

The Structure and Kinematics of Gas in the Center of Recent Burst of Star-Formation in the Irr Galaxy IC10

Egorov O.V.[1], Lozinskaya T.A.[1] and Moiseev A.V.[2]

[1]Sternberg Astronomical Institute, Moscow State University, Russia
[2]Special Astrophysical Observatory of the Russian Academy of Sciences, Nizhnij Arkhyz, Russia

The dwarf irregular galaxy IC10 is the nearest starburst galaxy, which is remarkable by its number of WR stars per unit luminosity, the highest in the LG. The region of recent star formation resides in a giant complex of multiple ionized shells in the Northeastern sector of the galaxy. We report the preliminary results of observations of ionized and neutral gas in the entire complex of ongoing star formation made with the 6-m telescope of the Special Astrophysical Observatory of the Russian Academy of Sciences using MPSF field spectrograph and SCORPIO focal reducer operating in the scanning Fabry-Perot interferometer mode. We use our FPI observations in the H-alpha and [SII] lines to estimate the expansion velocities of the two brightest shell-like nebulae HL111 and HL106 in the complex, and reveal faint high-velocity features for the first time. An analysis of 21-cm line VLA observations of the galaxy allowed us to identify two local HI shells surrounding HL111 and HL106, and estimate their expansion velocities.

Studying the Dust Properties of Dwarf Galaxies at Submm Wavelengths with LABOCA.

Galametz M.

CEA, Saclay, France

We are studying the dust properties (mass, temperature, composition) of low metallicity environments. 4 low metallicity galaxies (Haro 11, Mrk 1089, UM 311 and NGC 1705) were observed with LABOCA on the Atacama Pathfinder EXperiment (APEX) telescope at 870 μm. We model their spectral energy distributions (SEDs) combining the submm observations of LABOCA, 2MASS, IRAS, Spitzer photometric data and the IRS data for Haro 11. We find that a significant mass of dust is revealed when using submm constraints compared to that measured with only mid-IR to far-IR observations extending only to 160 μm. For Haro 11 and NGC 1705, an excess at submm wavelengths is detected, excess that we modeled by an independant cold dust component (10 K) to better describe the high 870 μm derived from LABOCA observations. We find that at least 70 % of the dust mass of these 2 galaxies can reside in a cold dust component. We also show that the subsequent dust-to-gas mass ratios, considering HI and CO observations, can be strikingly high for Haro 11 in comparison with what is usually expected for these low-metallicity environments. Deriving the star formation rate of our galaxies and comparing them to the Schmidt law, we fing that Haro 11 falls anomalously far from the relation. These results may suggest that a reservoir of hidden gas could be present in molecular form not traced by the current CO observations. Furthermore, we gather a broader sample of galaxies containing metal-rich and metal-poor galaxies. We show that submm data are crucial in the SED modelling of metal-rich galaxies to avoid an overestimation of the dust mass of the galaxies (since the cold dust mass is poorly constrained when submm are not used) and in the SED modelling of low-metallicity galaxies to avoid missing the submm excess which is often detected in these galaxies and which deeply influences the total dust mass of the galaxy. We also study the influence of parameters such as Z, T etc. on the dust mass estimates derived from the SED models when submm constraints are used or not.

Dust Evolution as Seen from the Nearby Universe

Galliano F.

CEA, Saclay, France

I will review two studies aimed at characterising the various processes controlling ISM dust formation and destruction. I will first show that nearby dwarf galaxies provide crucial constraints on dust evolution models. Then, I will present relevant ISO and Spitzer data of nearby dwarf galaxies, including the Large Magellanic Cloud (data from the SAGE legacy program). I will discuss the effects of metal enrichment and star formation activity on the abundances of the main dust species, and on their physical conditions and distribution within the ISM. Finally, I will discuss the contribution that Herschel will bring to our understanding of dust evolution, and its implications on galaxy evolution through cosmic times. Poster:The Very peculiar mid-IR properties of dwarf galaxies I will present the variety of mid-IR features that are prominent in the ISO and Spitzer spectra of dwarf galaxies. Then, I will discuss the unique diagnostics they provide on the physical conditions of the UV illuminated surface of the molecular clouds.

H-alpha Imaging Survey of Galaxies within 10 Mpc

Karachentsev I.D. and Kaisin S.S.

Special Asrtophysical Observatory of the Russian Academy of Sciences, Nizhnij Arkhyz, Russia

We present results of systematic H-alpha imaging survey of ∼200 nearby galaxies performed with the 6-m SAO telescope. Together with data from other surveys it yields H-alpha fluxes for ∼400 galaxies situated within 10 Mpc. We discuss scaling relations between the global star formation rate [SFR] derived from H-alpha flux, total K-band luminosity, and total hydrogen mass M_{HI} for the almost unbiased, volume-limited sample of neighboring galaxies. The dimensionless, distance independent diagnostic diagram "past-future", {P,F}, is introduced to fix the evolution status of different type galaxies, where $P = \log(SFR \times T_0/L), F = \log(M_{HI}/SFR \times T_0)$, and T_0 is the age of the universe. These diagrams reveal burst-like activity in dIrr and BCD galaxies that seems to be their internal property, only slightly dependent on environment.

Low Surface Brightness Dwarf Galaxies in the General Field

Karachentseva V.E.[1], Sharina M.E.[2] and Shipova K.V.[3]

[1]**Main Astronomical Observatory, National Academy of Sciences of Ukraine, Kiev, Ukraine**
[2]**Special Astrophysical Observatory of the Russian Academy of Sciences, Nizhnij Arkhyz, Russia**
[3]**Kazan State University, Kazan, Russia**

We revised our old "Catalog of LSB dwarf galaxies" (1988, Communic. of SAO, v.57, pp. 5–119), as well as recent lists of nearby dwarf galaxy candidates, and got an all-sky sample of six handred LSB dwarf galaxies situated outside the known nearby clusters and groups. About half of them have radial velocities measured via HI line. Some basic properties of the sample are discussed.

Planetary Nebulae and HII Regions as Probes of the Evolution of Local Group Galaxies

Kniazev A.Yu.

South African Astronomical Observatory, Cape Town, South Africa

The nearest galaxies are an excellent laboratory for studies of stellar populations and evolution. Their stellar populations can be characterized using color-magnitude diagrams of resolved stars. However, the star formation histories are model-dependent and should be compared with further observational data that can be obtained for these galaxies. In particular, individual HII regions, planetary nebulae (PNe) and different types of emission-line stars are available for spectroscopy in the Local Group (LG) galaxies with present-day large telescopes. They can be used as independent tracers of the kinematics, metallicity and evolution of different stellar populations. I will present some latest results of our studies on HII regions and/or PNe in some near dwarf galaxes.

Constraints on Star Formation Law for dSph Galaxies

Kurbatov E.

Institute of Astronomy of the Russian Academy of Sciences, Moscow, Russia

Two series of dSph galaxies were modelled with the same model initial conditions from ΛCDM cosmology but with different star formation laws. Simulations were performed using the three-dimensional gravitational gas dynamical and N-body code GADGET-2 with star formation included. The observable characteristics of the modelled galaxies were compared with empirical relations, such as mass–radius, radius–surface brightness, luminocity–velocity dispersion (the Faber-Jackson relation) and the position of galaxies on radius–magnitude plane relative to the Shapley line. Results: (i) Comparison between the model results and the empirical relations allow us to rule out the most popular star formation law $SFR\ \rho^{3/2}$ while the quadratic one $SFR\ \rho^2$ passes most of the tests. (ii) The empirical relations between galactic integral parameters can be caused by LambdaCDM initial conditions only, so the environmental effects are not necessary for dSph evolution.

Fresh Views of Enigmatic Dwarf Galaxies in the Nearby Universe

Lee M.J.

Seoul National University, Republic of KOREA

Dwarf galaxies, once considered to be boring faint and tiny galaxies, are playing a critical role in the era of precision cosmology. I present fresh views of some enigmatic dwarf galaxies in the nearby universe, in terms of galaxy structure, star formation history, and star clusters.

Age and Metallicity of Two Dwarf Spheroidal Galaxies in the Cen A Group

Makarova L.N. and Makarov D.I.

Special Asrtophysical Observatory of the Russian Academy of Sciences, Nizhnij Arkhyz, Russia

Stellar magnitudes and colors of two dwarf spheroidal galaxies situated in the nearby Centausus A group were measured using deep images obtained at the HST/ACS. We obtain periods of star formation in these galaxies, ages and metallicities of the resolved stellar populations. The dwarf spheroidal galaxies KK 198 and ESO 269-066 show unusually wide red giant branch indicating high metallicity (up to the solar) of the significant part of resolved stellar population. We will consider detailed star formation histories for the galaxies and discuss probable reasons for the high metal abundance.

The Star Formation History of Dwarf Irregular KKH 98 Revealed by the Optical - IR Colors and Magnitudes of IR-Luminous Stars

Melbourne J.

Caltech California Institute of Technology, Pasadena, USA

In the local volume, the star formation histories (SFHs) of galaxies can be obtained through resolved photometry of individual stars. For instance, the ACS Nearby Galaxy Survey Treasury (ANGST) program has obtained deep optical Hubble Space Telescope (HST) imaging of galaxies in the local 4 Mpc volume providing strong constraints on their SFH. We recently obtained high spatial resolution (0.1″), Keck laser guide star adaptive optics, near-IR imaging of the ANGST dwarf irregular galaxy KKH 98. The Keck images reveal the evolved IR luminous asymptotic giant branch (AGB) and upper red giant branch populations. Because AGB stars reside in unique sequences in near-IR color-magnitude space, as a function of age and metallicity, we demonstrate that the SFHs of KKH 98 can be obtained from as few as 400 IR luminous stars. As IR luminous stars are significantly less crowded than fainter stars, these techniques will allow future missions such a adaptive optics on the Thirty Meter Telescope and the James Webb Space Telescope to measure star formation histories from resolved stars in Virgo and beyond.

The Ionized Gas Kinematics in Dwarf Galaxies: 3D Spectroscopic Study

Moiseev A.V.

Special Asrtophysical Observatory of the Russian Academy of Sciences, Nizhnij Arkhyz, Russia

We briefly review kinematic properties of ionized gas in about 30 dwarf nearby galaxies. The Hα spectroscopic data were obtained with scanning Fabry-Perot interferometer at the 6-m telescope in the framework of the several observational projects. The observed velocity fields were fitted by simple models of a rotating thin disc. The HI and HII spatially resolved kinematic data are compared in particular objects. We discuss the role of different factors (violent starformation, recent interactions and mergers, etc.) in the formation of the observed kinematic features.

A Chemical Evolution of NGC147 and Fornax Dwarf Galaxies: the Merger Scenario

Nykytyuk T.

Main Astronomical Observatory National Academy of Sciences of Ukraine, Kyiv, Ukraine

A chemical evolution of two Local Group dwarf galaxies (NGC147 and Fornax) is considered in the framework of the merger scenario. We supposed a galactic stellar system to be formed as separate fragments which merge afterwards. Thus, we can calculate the set of such fragments to reproduce the observed metallicity distribution function of a galaxy. Accordingly, if dwarf galaxies were such the systems, which, once merged, have formed massive galaxies, one fragment is more then enough to reproduce the observed metallicity distribution function of such a dwarf galaxy. To test this assumption, the stellar metallicity distribution functions of NGC147 and Fornax dwarf galaxies were calculated in the framework of the merger scenario. More than one fragment was obtained for galaxies under consideration; thus, it is unlikely the systems similar to NGC147 and Fornax to be building blocks of massive galaxies.

Star Formation at z=1 in Nearby Galaxies

Prugniel P.

Observatoire de Lyon, France

Reconstruction of the star formation and metal enhancement history in dwarf galaxies, either from CMD or integrated light spectroscopy, provide indications about the distant past of dwarf galaxies of various types and in different environments. We start to precise the ideas concerning the key mechanisms of the evolution and identify the precursors of the local galaxies in the remote Universe.

Study Evolutionary Status of Dwarfs in the Nearby Lynx-Cancer Void. Preliminary Results

Pustilnik S.A.[1], Tepliakova A.L.[1] and Kniazev A.Y.[2]

[1]Special Asrtophysical Observatory of the Russian Academy of Sciences, Nizhnij Arkhyz, Russia
[2]South African Astronomical Observatory, Cape Town, South Africa

The evolutionary status of dwarf galaxies, as the most "fragile" and susceptible to external perturbations, is expected to be sensitive to their environment. While in the denser aggregates, such as clusters and groups, this effect is known and more or less systematically studied, the situation for underdense regions (voids) is still poorly understood. We undertake the systematic study of about 50 dwarf galaxies within the nearby small (distance to the center of ∼14 Mpc, size of ∼10 Mpc) void in Lynx-Cancer. Our program includes long-slit spectroscopy to determine O/H in HII regions of late-type galaxies, the surface photometry in ugriz on the SDSS images, the colour estimates for ages and stellar mass determination, and the total HI emission measurements to determine the neutral gas parameters. We present the summary of observational results on part of this void dwarfs and discuss them in relation to their evolutionary status. The current data suggest on the excess of "unevolved" galaxies and hint on the void environment as the most favorable for the slow evolution and the delayed galaxy formation.

Star Formation in Extremenly Faint Local Volume Dwarf Galaxies

Roychowdhury S.

National Centre for Radio Astrophysics, Tata Institute of Fundamental Research, Pune, India

We study the relationship between the gas column density (derived from GMRT 21 cm data) and the star formation rate surface density (derived from publicly available GALEX far UV data) for a sample of 23 extremely faint dwarf irregular galaxies drawn from the Faint Irregular Galaxy GMRT Survey (FIGGS). Our sample galaxies have a median HI mass of 2.8×10^7 solar masses and a median blue magnitude –13.2. We find that gas column density averaged over the star forming region of the disk lies below most estimates of the "threshold density" for star formation, and that the average star formation rate surface density for most of the galaxies is also lower than would be expected from the "Kennicutt-Schmidt" law (Kennnicutt 1998). We also use our data to look for small scale (400 pc and 200 pc) correlations. At 400 pc linear resolution, for 18 of our 23 galaxies, we find that star formation rate surface density can be parametrized as having a power law dependence on gas column density, which varies accross the sample and is in general steeper than "Kennicutt-Schmidt" law. The power law relation holds until one reaches the sensitivity limit of the GALEX data, i.e. we find no evidence for a "threshold density" below which star formation is completely cut off. For the 5 galaxies for which a power law does not provide a good parametrization, there are substantial offsets between the UV bright regions and the HI high column density maps. At 200 pc resolution, the offsets between the peaks in the HI and UV images are more pronounced, and a power law parametrization is possible for only 5 of 10 galaxies. The study is repeated with the star formation rate surface density being derived using SAO H-alpha observations for some of the galaxies in the above sample.

Unveiling NGC 205: a Galaxy Undergoing Morphological Transformation?

Saviane I.

European Southern Observatory, Santiago, Chile

With a fresh analysis of archival HST/WFPC2 imaging, and of a recently published, very deep and wide-area photograph of NGC 205, we have discovered very promising evidence that this galaxy might harbor a stellar disk inside its prominent spheroidal halo. NGC 205 is classified as a dwarf elliptical galaxy, based on the morphology of its luminous stellar component, but in the course of the years many features have emerged that are hard to reconcile with this classification. If confirmed, our discovery would explain many of these peculiar characteristics. I will describe how we are collecting a new body of evidence that will be used to test our work hypothesis, that NGC 205 is the the closest example of a galaxy undergoing morphological transformation.

Globular Clusters as Building Blocks of Galaxies

Sharina M.E.

Special Asrtophysical Observatory of the Russian Academy of Sciences, Nizhnij Arkhyz, Russia

We analyse the 6m telescope medium-resolution spectra of 31 globular clusters in galaxies of different luminosities and morphological types, situated in nearby groups and in the field. Measurement of the Lick absorption-line indices and comparison with SSP models enable us to obtain ages, metallicities, and α-element ratios of the globular clusters. Using our results and data form the literature, we find that the old and intermediate-age globular clusters of low surface brightness dwarf galaxies are systematically poorer in metals at a given age than the ones of more massive irregular dwarf galaxies and of the disc components of nearby spirals M31 and M33. On the other hand, old and intermediate-age globular clusters in luminous early-type dwarf galaxies, and even some dSphs are richer in metals than the star clusters representing dynamically "cold" environments of gas-rich galaxies and galaxy sub-systems.

Mixing of Metals in Blue LSB Galaxies

Shchekinov Y.

Southern Federal University, Rostov-on-Don, Russia

Sporadic star formation in low-surface brightness galaxies produces a highly inhomogeneous distribution of metals in the interstellar medium. Mixing driven by convective motions spreads metals through gaseous disks, such that the spatial metal distribution becomes smoother in time. The characteristics of local inhomogeneities and large scale nonuniformity of metals in the galactic disks, along with photometric characteristics and patial distribution of HII regios, can therefore be used for determining the galactic age. We discuss this possibility on a sample of low-surface brightness galaxies.

Dwarf Lenticular Galaxies in Groups: Structure and Evolutionary Census

Sil'chenko O.

Sternberg Astronomical Institute, Moscow State University, Russia

We present some results of investigating small lenticular galaxies in groups. We consider the objects with $M_B \approx -18$, mostly the close neighbours of giant galaxies. In contradiction to the common view, these lenticular galaxies do not possess prominent bulges; moreover, their structure can be often fitted best of all by a single exponential disk. Despite the reddish integrated colours, the stellar population in the centers is rather young, of 1–2 Gyr on average; sometimes the current star formation is detected. We conclude that these dwarf galaxies evolve in correspondence with the overall downsizing tendency of the Universe evolution: while giant lenticular galaxies have finished their transformation from spirals some 3–5 Gyrs ago, the dwarf lenticulars suffer this transformation (from irregulars?) close to the present epoch.

Sizes of Minivoids in the Local Volume: Another ΛCDM-Overabundance. Possible Solutions

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I will present resent results on the luminosity function, the peculiar velocities, and the sizes of voids in the Local Volume (LV) in observational samples of galaxies which contain galaxies down to $M_B = -10$ and to $M_B = -12$ within the distance 4 – 8 Mpc. When we compare the results with the predictions of the standard cosmological ΛCDM model, we find that the theory faces a sever problem: it predicts a factor of ten more dwarf haloes as compared with the observed number of dwarf galaxies. In the LV we identify voids with sizes ranging from 1 to 4.5 Mpc and compare the observational distribution of void sizes with the voids in very high resolution simulations of the ΛCDM model with WMAP1 and WMAP3 parameters. The theoretical Void Function matches the observations remarkably well only if we use haloes with circular velocities V_c larger than 40 – 45 km/s ($M_{vir} = (1-2)10^{10} M_\odot$) for models with with $\sigma_8 = 0.9$ and $V_c > 35$ km/s ($M_{vir} = (6-8)10^9 M_\odot$) for $\sigma_8 = 0.75$. We exclude the possibility that in the ΛCDM model haloes with circular velocities <35 km/s can host galaxies as bright as $M_B = -12$: there are too many small haloes in the ΛCDM model resulting in voids being too small as compared with the observations. The problem is that many of the observed dwarf galaxies have HI rotational velocities below 25 km/s that strictly contradicts the ΛCDM predictions. Thus, the ΛCDM model faces the same overabundance problem, which it had with the number of satellites in the LG but this ΛCDM-problem in voids is more severe since much more physics (like ram-pressure and tidal stripping) may be involved in explaining of the excess of model substructures in halos with $M_{vir} \sim 10^{12} M_\odot$ over the observed number of satellites in the Local Group. Possible solutions of ΛCDM-overabundance in voids include 1) observational determination of significant number of field very low surface brightness galaxies (dSphs?) 2) quenching of star formation in void DM halos (for instance by UV-background at the epoch of reionization); 3) nonbarionic solution with Warm Dark Matter model; 4) possibility that dwarf galaxy with rotational velocity Vrot is hosted by DM halo more massive than it is expected (from galaxy dynamics) i.e. by halo with circular velocity $V_c \sim 1.5-2V_{rot}$. We also estimated the rms deviations from the Hubble flow σ_H for galaxies at different distances from the Local Group and find that in most of our model LV-candidates the rms peculiar velocities are consistent with observational values: $\sigma_H = 50$ km/s for distances less than 3 Mpc and $\sigma_H = 80$ km/s for distances less than 8 Mpc. At distances 4 (8) Mpc, the observed overdensities of galaxies are 3.5–5.5 (1.3–1.6) — significantly larger than typically assumed.

Galaxy Groups as Defined by the Distribution of Dwarf Galaxies.

Tully B.

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Most galaxies lie in groups. However if only information on high surface brightness spirals, lenticulars, and ellipticals is available, say those brighter than $M_R = -16$ as has been typical, then low mass groups are poorly delineated. The morphologies of groups becomes clearer when inventories are inclusive of the dwarf populations, reaching $M_R = -11$ and even fainter in some cases. The statistics on group membership become sufficiently significant to distinguish the virial from infall regions and enables studies of the variations in galaxy properties between these distinctive regions.

Dwarf Galaxies in the Canes Venatici Cloud

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The improved distance moduli of 30 dwarf galaxies in the Canes Venatici Cloud I (CVn I) were determined using advanced Tip of Red Giant Branch (TRGB) method (Makarov et. al. 2006). The method was determined for accurate estimation of the distances even if TRGB situated near photometric limit. The data were taken from the Data Archive of the Hubble Space Telescope (HST). Photometry of the resolved stellar populations of the galaxies were performed using DOLPHOT and HSTphot packages for crowded field stellar photometry (Dolphin 2000).The new more accurate distances allows us to clarify the 3D structure of the Canes Venatici I Cloud. It can be clearly distinguished the central group of the galaxies around M94 and the outskirt which is situated in gravitational field of the "core". The mass and mass-to-light ratio of the CVn have been estimated.

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Ionization Composition of Dwarf Galaxies

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We present calculations of the non-equilibrium ionic states of C, N, O, Ne and Fe for gas in dwarf galaxies. We consider low-metallicity gas photoionized by the typical ionizing radiation for the local universe. We study physical conditions under which the transition from collisionally ionized to photoionized ionic states occurs.

The Stellar Content of I Zw 18: Constraints from Synthetic Color-Magnitude Diagram Modelling

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Last optical studies of the stellar populations in the blue compact dwarf galaxy I Zw 18 have led to quite controversial results as concerns the distance to the galaxy and the presence of the old red giant branch stars. Therefore we performed a new detailed photometric study of I Zw 18, reconsidering these issues with the use of the available archival HST images. Special care is given to accounting for the photometric errors and crowding effects, removing the false detections and diffuse background objects, which is shown to be obligatory for reliable interpretation of the observed color-magnitude diagrams (CMD) of I Zw 18. Then we apply synthetic CMD approach with extensive artificial star tests to put constraints on the distance and the total stellar mass locked in the young and old populations. From the spatial distibution of the stars in I Zw 18 a conclusion is made about the near absence of the extended halo of the red giants, which cannot be explained by the incompleteness of the data only. Overall, the mass fraction of the possible red giant branch stars in I Zw 18 is assessed to be small as compared to the mass confined in the young stellar population.

Probing Dark Matter Halos of Galaxies through Dwarf Galaxies

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Dwarfs are one of the best available probes of outer galactic halos. Using dwarf galaxies we are studying the dark matter halo of late-type spirals. Our sample consists of about 80 dwarf galaxies and 7 primaries spirals. With the help of the VLT (VIMOS) telescope for our sample we have doubled the amount of the known dwarfs respect to the known ones from the catalogues. I will discuss the distribution of dwarfs around the primaries and the extension of dark matter halos.

POSTERS

Metallicity of Ionized Gas in the Irr Galaxy IC10

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The dwarf irregular galaxy IC10 is the nearest starburst galaxy, which is remarkable by its number of WR stars per unit luminosity, the highest in the LG. H and [SII] line images of this galaxy show a giant complex of multiple shells and supeshells. The Irr galaxy IC10 is observed with the 6-m telescope of the Special Astrophysical Observatory of the Russian Academy of Sciences. Five spectrograms named by their position angles PA0, PA45, PA132, PA268 and PA331 were taken with SCORPIO focal reducer operating in the slit spectrograph mode. The data on the spectrum of gas emission in the region of ongoing star formation is reported and the relative O/H, N/O and S/O abundances are determined for about twenty HII-regions.

The Very Peculiar Mid-IR Properties of Dwarf Galaxies

Galliano F.

CEA, Saclay, France

I will present the variety of mid-IR features that are prominent in the ISO and Spitzer spectra of dwarf galaxies. Then, I will discuss the unique diagnostics they provide on the physical conditions of the UV illuminated surface of the molecular clouds.

Observational Database for Exploring the Local Universe

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We describe a project to compile basic observational data on the Local Volume galaxies situated within 10 Mpc distance of us. The database will be an extended and updated version of "Catalog of Neighboring Galaxies" (2004, AJ, 127, 2031). It will contain existing data on optical, UV, IR, H-alpha and HI properties of 730 galaxies, being also supplied with their images. Systematization of the data and orginization of fast Web-access to them are discussed.

Blueshifted dwarf galaxies in the Virgo cluster

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We consider a sample of 65 galaxies in the Virgo cluster that have negative radial velocities with respect to the Local group. Some properties of the sample are noticed. All the objects reside compactly within the 6-degree virial radius, but their centroid is displaced at 1.1 degree towards NW from the dynamical cluster center, M87. Surprisingly, dwarf galaxies of the sample exhibit a clumpiness on a scale of 10 arcmin (50 kpc). The observed NW asymmetry of the blueshifted galaxies may be interpreted as evidence for merging of the M86 subcluster with the main Virgo cluster body (Binggeli et al. 1993). A new attempt is made by us to explain this phenomenon taking into account the tangential motion of the Local group regarding to the Virgo cluster caused by its pushing from the Local void.

Surface Brightness Profiles of Galactic Star Clusters Imaged by SDSS.

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The determination of structure and stellar content of extragalactic star clusters is important for studying assembly histories of galaxies. The working methods have been traditionally tested by comparing the properties (colors, luminosities, half-light radii) of remote stellar systems with those of better understood local templates. We present surface-brightness photometry of open and faint globular Galactic star clusters imaged by SDSS. The integrated colors, central surface brightnesses, and half-light radii of the globular clusters correspond well to those in the catalogue of Harris (1996).

Red-Sequence Dwarf Galaxies in Clusters

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We select 11 clusters of galaxies in region of the Leo Supercluster and determine the total luminosities and masses within comparable physical regions (radius R_{200} close to the virial radius). We isolate and analyze the red-sequence galaxies in color-magnitude diagrams of these clusters using observational data from the Sloan Digital Sky Survey (SDSS DR6). To identify dwarf cluster members in the magnitude range $r = 17 - 20$, we use color cuts in $u-r, g-r, r-i$ and photometric redshifts. We construct the composite luminosity function of spectroscopically confirmed members of clusters to $M_r = -18^m$ and the composite luminosity function red-sequence galaxies to $M_r = -16^m$. We also study how the number ratio of dwarf to giant galaxies (DGR) depends on global cluster properties (richness, velocity dispersion, mass, optical luminosity), we find no correlations between them. We find that the DGR for the red-sequence galaxies for most of the clusters slightly decreases in the central cluster region.

Decay of OB Associations and Evolution of Dwarf Galaxies

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The accepted view is the most of the star formation in galaxies occurs in stellar associations. OB associations has short lifetime from their birth till decay, about few Myrs. After decay the stars gain velocities from 2 to 8 km/s. The escape velocity in dwarf galaxies can be as low as 20 km/s and even lower. I investigate the possibility of ejection of the stars form dwarf galaxies and the observational imprints of this.

Ionized-Gas Kinematics in Very Metal-Poor Dwarf Galaxies and Implications for Star Formation Triggers

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We present the results of study of ionized gas kinematics in nine eXtremely Metal-Deficient (XMD) galaxies with the SAO 6-m telescope scanning Fabry-Perot interferometer (FPI). Some of these very rare objects (with the range of O/H of $7.12 < 12 + \log(\mathrm{O/H}) < 7.65$), are believed to be the best proxies of 'young' low-mass galaxies in the high-redshift Universe. One of the main goals of this study was to look for possible evidence of the star formation (SF) activity, induced by external perturbations. The recent results of a small subsample of XMD star-forming galaxies HI mapping provided the confident evidence on the important role of the interaction-induced SF in this group. Our new FPI data give for the great majority of the studied XMD dwarfs a complementary or new information with further evidence on strongly disturbed gas morphology and kinematics, or the presence of detached components. We approximate the observed velocity fields by simple models of a rotating tilted thin disc, which allow us the robust detection of significant to strong kinematic disturbances. These data, in turn, indicate the important role of current/recent interactions and mergers in the observed enhanced star formation.

The Modelling of Mass-Metallicity Relation for Dwarf Spheroidal Galaxies

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The results of the mass metallicity relation modelling for the dwarf spheroidal (dSph) galaxies are presented. In this work a single-zone chemo-dynamical model is used. The model is based on the scheme suggested by C. Firmani and A. Tutukov (1992). We show that metallicity is a decreasing function of mass for dwarf spheroidal galaxies with the total mass $M_{tot} < 10^8 M_\odot$, and a monotonously increasing function at higher masses.

Pairs, Groups and Filaments of Dwarf Galaxies in the Nearby Lynx-Cancer Void as a Reflection of Void Dark Matter Distribution

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The web of the three-dimensional matter distribution in the Universe is well reproduced in the N-body simulations of Dark Matter in voids, albeit scaled-down (Gottloeber et al. 2003). However, observationally, the distribution of real galaxies in voids, expected to follow the DM distribution, is poorly known due to lack of information on galaxies in voids in general. In the study the nearby Lynx-Cancer void, we find that dwarf galaxies populating this region form correlated stuctures — either pairs, or quasilinear filaments. The latter are suggested recently as "bridges" (Park & Lee 2009), along which the baryon matter can inflow into galaxies formed in a filament and feed their "activity". Voids are a suitable environment to check this mechanism. We present the list of Lynx-Cancer void pairs and probable filaments and some of their relevant parameters, and discuss the potential of Lynx-Cancer void in studies properties of "low-mass" filaments.

The Expansion of Disk Galaxies

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Based on the stellar photometry of the nearby disk galaxies we choose stellar subsystems of different ages, from 30 Myr to several Gyr old. The dependence of stellar subsystems sizes on their age is found for each galaxy. In order to explain this dependence we have adopted the expansion of the stars of disk galaxies (irregular and spiral) both along the radius and perpendicular to the plane of the disk. Velocities of subsystems expansion change from 4–10 km/s at the age of 10–40 Myr to less than 0.1 km/s for the stars aged around several Gyr.

A new distance to IC342.

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On the basis of Hubble Space Telescope archive images stellar photometry of a field of the spiral galaxy IC342 is carried out and its distance is determined by TRGB method ($D = 3.93 \pm 0.10$Mpc). The obtained distance indicates that the galaxy IC342 appears to be near the Maffei1 galaxy (D = 4.1 Mpc) and makes it possible to consider these galaxies as a center of one group. The analysis of optical and radio data on KK35, being a possible satellite of IC342 galaxy, indicates that KK35 is not a galaxy but one of the bright star formation regions in the spiral arms of IC342.