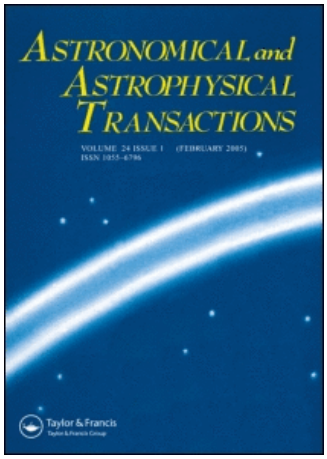

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Conference news

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CONFERENCE NEWS

The 17th Seminar of the Working Group "Physics of the Interstellar Medium and Nebulae"

The Seminar was held on February 6, 1991, in the Sternberg Astronomical Institute of the Moscow State University. This is the seventeenth meeting of this kind; the first one took place almost ten years ago, in April 1981. The Seminars unite a part of the Soviet astronomical community, interested with the interstellar medium (ISM) and associated problems. These Seminars are always one-day meetings intended for brief reports (usually numbering a dozen, each report lasting not longer than twenty minutes) and for exchange with the latest ISM news. Out of the 55 listed members of the Working Group, affiliated at observatories and universities all over the Soviet Union, on the average about thirty persons are present at the Seminar. Normally the Seminars are held once or twice per year. There are also wider meetings of the Working Group, gathering from 50 to 80 participants. The fifth such meeting took place in October 1990 in a tourist hotel at Tseya, Northern Caucasus.

The 17th Seminar of the Working Group was not just a routine one. It was specially dedicated to the memory of the eminent Soviet astrophysicist Solomon Borisovich Pikelner, who contributed greatly to theory of physical processes in the ISM. He was the author of a few classical books on the ISM, Cosmic Electrodynamics, Solar Physics and so forth. Many of the Soviet astronomers now active in these fields consider themselves as Solomon Borisovich's followers.

The opening word at the Seminar was given by the Chairman of the Working Group Dr. N. G. Bochkarev. He evoked Prof. Pikelner's outstanding role in the formation of basic ideas on the ISM. Most of the speakers at the Seminar also devoted some part of their talks to share with the listeners their souvenirs about Prof. Pikelner.

The first report was by Dr. Rashid A. Syunyaev (Space Research Institute, USSR Academy of Sciences, Moscow) who gave the latest news from the Soviet Orbiting Observatory *GRANAT*. In January 1991, the *GRANAT* group observed an X-ray nova in Musca. The nova was for the first time seen in the 10–60 keV band on January 8; it then declined and brightened again around January 27. Optical and radio data from ground-based observatories show this object to be a typical nova. X-ray spectra taken beyond 100 keV strongly suggest that there is a black hole in this binary system.

Dr. Yu. N. Gnedin from the Pulkovo Observatory, Leningrad, spoke about some problems of elementary particle physics and their possible connection with the ISM. Recently axions—particles with a mass of about 10^{-5} eV—were suggested as possible carriers of hidden mass. The decay of axions in the ISM may yield some observable effects, such as spatial oscillations of interstellar

extinction (at scales of about 0.6 kpc) and rotation of linear polarization vector of radiation, especially pronounced in X-rays; this latter effect can probably be detected in future X-ray experiments.

Dr. T. A. Lozinskaya (Sternberg Astronomical Institute, Moscow) reported on her studies of ring-like nebulae associated with oxygen-sequence Wolf–Rayet stars. These stars are very short-living (and therefore quite rare) objects; only a few are known. All of them possess very intense stellar winds (with velocities as great as several thousand km/s), capable to blow out a bubble in the ISM, some parsecs in diameter, which is observable as a ringlike nebula surrounding the star.

K. V. Bychkov from the Sternberg Astronomical Institute presented a talk on the supernova remnants at the stage with counterpressure. His calculations show that after the remnant's coming to an adiabatic regime, the relative thickness of the remnant's shell is growing. Some observational implications of this evolutionary stage are discussed; in particular, at radio wavelengths a low-surface-brightness source may be observed.

Yu. I. Glushkov (Sternberg Astronomical Institute) presented his observational results on three remarkable HII regions: S 106, S 235ABC, NS 14. They all are located in regions of active star formation and are tightly connected with surrounding molecular clouds.

D. Ishankuliev (Physics Department, Moscow State University) considered statistical properties of radiation field in strong interstellar molecular masers. He showed that during strong flares of H_2O masers, a large degree of coherence of radiation may be achieved; this can be considered as a self-induced phase transition in a non-equilibrium interstellar medium.

V. V. Krymkin, E. A. Abramenkov, and M. A. Sidorchuk (Radio Astronomy Institute, Ukrainian Academy of Sciences, Kharkov) studied the Andromeda Nebula at low frequencies ($\nu = 10$–30 MHz) with a resolution of 28′ at 25 MHz on the UTR-2 radio telescope. They have revealed at least three components of radio emission, including the disc, a ring of ionized hydrogen, and, for the first time with such certitude, the radio corona of M 31.

Dr. Yu. N. Efremov (Sternberg Astronomical Institute, Moscow) presented his scenario of origin of fragmentary spiral structure in galaxies. This fragmentary structure is due to the self-regulating process of star formation in spiral arms. Star formation is concentrated in giant star-gas complexes, whose dimensions determine the characteristic size of spiral-structure fragments.

V. G. Surdin (Sternberg Astronomical Institute, Moscow) in his talk entitled "Bursts of star formation in central molecular discs of galaxies" noted that the central part of the molecular disc of our Galaxy behaves as a unified giant molecular cloud ($M \approx 10^8 M_\odot$). Smaller clouds cannot exist due to tidal instability. If star formation is initiated in this cloud then a powerful star forming burst may occur. Some galaxies with active star formation (NGC 404, NGC 1068) really do have central molecular discs with appropriate masses.

Yu. F. Mal'kov (Crimean Astrophysical Observatory, Academy of Sciences of the USSR, Nauchny) analysed a new model of formation and emission of clouds in gas flows near active galactic nuclei. The clouds, according to his model, are formed in the infalling matter around the AGN as a result of thermal instability and are in a state of free fall towards the nucleus. There is observational evidence of correlated variability of the nucleus continuum and cloud emission lines, thereby it turns out that positive-velocity clouds are closer to the observer, thus lending support to the proposed model.

V. V. Golovatyj (Astronomical Observatory, Lvov State University, Lvov) and Yu. F. Mal'kov (Crimea) suggested a self-consistent model of evolution of planetary nebulae. They showed that in their model a small scatter (not exceeding 20%) of resulting masses of white dwarfs—nuclei of PN can be explained by mass "standardization" occurring in the process of stellar evolution. Initial main sequence masses of the stars range between 1.5 and 8 $M_{\odot}$, but stars with greater masses have greater mass loss rates and lose more.

A. F. Kholtygin (Astronomical Observatory, Leningrad State University, Leningrad) reported his calculations of thermal losses in process of dielectronic recombination. This process may be important in low-temperature regions of the ISM with T of the order of a few thousand Kelvins (old supernova remnants, fossil HII regions, surroundings of active galactic nuclei, and so forth) and also in regions with anomalies of chemical composition (for example, winds of Wolf–Rayet stars).

To conclude, the 17th Seminar of the Working Group on the ISM was not the only meeting dedicated to the memory of Prof. S. B. Pikelner. The Astronomical Society of the USSR has organized a country-wide conference to commemorate the 70th anniversary of the birth of S. B. Piklener and another classic in the ISM, cosmic-plasma and other problems, Samuil Aronovich Kaplan, tragically dead in 1978. This conference was held in the city of Nizhnii Novgorod (formerly Gorky) at the end of March 1991 and was attended by more than two hundred Soviet scientists. Details on this conference will be given in another review.

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