EP 12 Astrophysik

Zeit: Dienstag 14:00–16:00 Raum: TU BH349

Hauptvortrag EP 12.1 Di 14:00 TU BH349

Massive black holes in the nearby and distant universe — •Stefanie Komossa — Max-Planck-Institut für extraterrestrische Physik, Giessenbachstr., 85748 Garching

Black holes are an unavoidable consequence of stellar evolution. With their extreme gravitational fields they are ideal 'laboratories' to search for effects of, and test predictions of, strong-field gravity. This review concentrates on 'supermassive' black holes (SMBHs); black holes with masses reaching up to ten billion times the mass of our sun. Such black holes are believed to be the prime movers of quasars, the most luminous long-lived objects in the universe. There is also growing evidence that SMBHs reside at the centers of most 'normal' galaxies, and that they play a major role in the formation and evolution of galaxies. In the high-energy regime, such black holes may reveal their presence by occasional disruptions of whole stars, causing giant flares of electromagnetic radiation. In some cases, supermassive black holes come in pairs and the final merging of the two is expected to produce a burst of gravitational wave radiation. This talk provides a review of recent exciting new results in black hole research. It concludes with a short glimpse into the next decade, when planned space-based missions are expected to enable accurate high-energy spectroscopy of matter in the immediate vicinity of the BH and the detection of gravitational waves from merging BHs which will open up a completely new window in the study of SMBHs and their cosmic evolution.

EP 12.2 Di 14:30 TU BH349

Modelling the dynamics of multiple black holes in galactic nuclei — •Rainer Spurzem and Gabor Kupi — Astron. Rechen-Inst. Moenchhofstr. 12-14, 69120 Heidelberg

We present direct N-body simulations of galactic nuclei, including post-Newtonian terms up to 2.5th order to follow merging processes between black holes and compact objects in the course of the N-body evolution, to model black hole physics in galaxies.

EP 12.3 Di 14:45 TU BH349

Pulse Shape Formation in Accreting X-Ray Pulsars — •Ute Kraus — Theoretische Astrophysik, Uni Tübingen

The pulse shapes of accreting X-ray pulsars are complex: often strongly modulated, in general dependent on photon energy and on luminosity, and at the same time stable and characteristic of each source.

I present model calculations that show how geometric effects and relativistic effects in combination produce typical properties of X-ray pulsar profiles. Taking full account of gravitational light deflection near the neutron star, these models include shadowing, reprocessing regions and displaced magnetic poles. Filled, hollow and sectional hollow accretion funnels are studied. The resulting pulse shapes show asymmetry, an energy-dependent relative size of peaks and an energy-dependent degree of modulation.

EP 12.4 Di 15:00 TU BH349

Multi-colour analysis of NGC 5907 — •Andreas Just — Astronomisches Rechen-Institut, Moenchhofstr. 12-14, 69120 Heidelberg

The vertical luminosity and colour profiles of edge-on galaxies can be used to reconstruct the dynamical evolution and the star formation history of the disc. We use deep photometry in U,B,V,R, and I band to analyze the composition in age of the stellar component as a function of vertical height. With self-consistent disc models including the gravitational potential of the gas component and the dark matter halo and with dust extinction we compute for a large variety of star formation histories and dynamical heating functions the vertical luminosity and colour profiles. The multi-colour analysis allows strong constraints on the stellar disc evolution and also on inclination and on the dust component. The results are compared to the evolution of the solar neighbourhood.

EP 12.5 Di 15:15 TU BH349

Spectral properties of interstellar turbulence — •Ralf Kissmann[1], Jens Kleimann[1], Horst Fichtner[1], Reinhard Schlickeiser[1], and Rainer Grauer[2] — [1]Lehrstuhl für Theoretische Physik IV, Ruhr-Universität Bochum, 44780 Bochum — [2]Lehrstuhl für Theoretische Physik I, Ruhr-Universität Bochum, 44780 Bochum

The energy inserted into the interstellar matter is mainly stored as turbulent kinetic energy. Actual heating of the ISM is then a consequence of the different wave-damping processes for different wave types the turbulence consists of. E. g. one has to gain knowledge about the contribution of compressional or incompressional modes, and possible anisotropies in the spectral form to obtain a clearer picture on the transfer rate into heat.

Apart from that the spectral properties of the interstellar turbulence are also of great interest in connection to the propagation of cosmic ray particles.

Since there are, so far, only indirect observational means to gain information on the situation in interstellar space, one has to rely on the capacity of numerical simulations in order to get any additional information on this complex system. Here we present our progress with such MHD simulations regarding the evolution of interstellar turbulence and show first results for the spectral transport in this environment.

EP 12.6 Di 15:30 TU BH349

Methode zur Messung der Reflektivitaeten der HESS Teleskope — •Erich Schreiber, David Berge und German Herman — MPI fuer Kernphysik, Saupferchweg 16, 69126 Heidelberg

H.E.S.S. ist ein System von vier abbildenden Cherenkov Teleskopen, dessen Aufbau im Khomas Hochland in Namibia im Dezember 2003 abgeschlossen wurde. Zur regelmässigen Kontrolle der optischen Qualität der 380 Einzelspiegel jedes Teleskops wurde am Max-Planck-Institut für Kernphysik in Heidelberg ein Aufbau entwickelt und getestet mit dem sich die Gesamtreflektivität eines Teleskops nach der 2f-Methode messen lässt. Berichtet wird über den Messaufbau, Labortests und erste Messergebnisse aus Namibia.

EP 12.7 Di 15:45 TU BH349

Zur Physik des Interstellaren Mediums — •Dieter Breitschwerdt — Institut für Astronomie, Universität Wien

Abstract lag zum Anmeldeschluss noch nicht vor.