SIMULATING GALAXY FORMATION IN COSMOLOGY

Giuseppe Murante (INAF - Astronomical Observatory of Torino) nam bo predaval o simulacijah galaksij v torek, 10. 5. 2011, **ob 12h v predavalnici F6**, FMF, Jadranska 19, Ljubljana. Vabljeni!

(POZOR! tokrat smo spremenili uro in predavalnico!)

Prejšnja predavanja so na razpolago na spletni strani astrodebata.fmf.uni-lj.si .

Povzetek predavanja (v angleščini):

We present a new multi-phase sub-resolution model for star formation and feedback in SPH numerical simulations of galaxy formation. Our model, called MUPPI (MUlti-Phase Particle Integrator), describes each gas particle as a multi-phase system, with cold and hot gas phases, coexisting in pressure equilibrium, and a stellar component.

Cooling of the hot tenuous gas phase feeds the cold gas phase. We compute the cold gas molecular fraction using the phenomenological relation of Blitz & Rosolowsky between this fraction and the external disk pressure, that we identify with the SPH pressure. Stars are formed out of molecular gas with a given efficiency, which scales with the dynamical time of the cold phase.

Our prescription for star formation is not based on imposing the Schmidt-Kennicutt relation, which is instead naturally produced by MUPPI. Energy from supernova explosions is deposited partly into the hot phase of the gas particles, and partly to that of neighboring particles. Mass and energy flows among the different phases of each particle are described by a set of ordinary differential equations which we explicitly integrate for each gas particle, instead of relying on equilibrium solutions. This system of equations also includes the response of the multi-phase structure to energy changes associated to the thermodynamics of the gas.

We apply our model to isolated disk galaxy simulations as well as to cosmological re-simulation of DM haloes potentially harbouring disk galaxies. MUPPI does reproduce the basic properties of the inter-stellar medium in disk galaxies and generates the correct SK relation both in isolated galaxies and in cosmological ones. We show the effect of having an efficient termal feedback on the gas accretion history of cosmological galaxies.