

AVVISO DI SEMINARIO

Il giorno 12 Giugno, alle ore 14.00, in aula Rasetti del Dipartimento di Fisica della Sapienza, il Dr. Daniele Antonangeli (UPCM, CNRS, Sorbone, Paris) terrà un seminario dal titolo “Physical properties of telluric planetary cores” (abstract in calce).

Physical properties of telluric planetary cores

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Knowledge of the interior structures of planets is critically important to the understanding of their formation, differentiation, present state, and evolution. Ultimately, even atmospheric and surface conditions are closely coupled to interior processes and have both a fundamental impact on the habitability of planetary environments. The comprehension of differences and similarities in planetary internal constitution and processes will also provide insights on the origin and evolution of our solar system.

Our solar system comprises four relatively small inner rocky planets (Mercury, Venus, Earth and Mars) and four more massive outer giant planets (the gas-giants Jupiter and Saturn, and the ice-giants Uranus and Neptune). The inner planets all share an Earth-like (telluric or terrestrial) layered internal structure: a central metallic core composed mostly of iron, surrounded by a silicate mantle, and a thin crust. However, differences in bulk masses and radii suggest different compositions and different mantle to core size ratios, and imply different pressure (P) and temperature (T) conditions in their center. This also reflects on the solid versus liquid state of the core and on the stable crystalline structure of its solid phase. Such a structural and compositional variability greatly influences the planet’s heat budget and internal dynamics, including the occurrence of internal convection, plate tectonics, and magnetic field generation in the core.

In this talk I will present recent measurements and ongoing efforts to determine the thermo-elastic properties of solid and liquid iron alloys at high pressure and high temperature needed for the interpretation and full exploitation of geodesy and seismological data to produce accurate models of the structure and dynamics of the metallic cores of the telluric planets of the solar system.