Università degli Studi di Cagliari
Dipartimento di Fisica

Istituto Nazionale di Fisica Nucleare
Sezione di Cagliari
High Energy Theory Group

Avviso di Seminario

Lunedì 12 Ottobre 2009
h. 16:00 – Aula C

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Tohoku University, Sendai 982-0826, Japan

Low-Energy Nuclear Reactions in Condensed Matter

Low energy nuclear reactions play a key role in various fields; for example, nuclear synthesis and energy production in stars as well as in thermonuclear fusion on the earth. In such cases, thermal nuclear reactions occur in various plasmas for the energy far below the Coulomb barrier. The cross section roughly represented by the Gamow factor drops nearly exponentially with decreasing energy. Thus, the reaction rate becomes very low, but is often affected strongly by the environment.
In this seminar, three topics of experimental research on the environmental effects provided by condensed matter for the nuclear reactions will be discussed: (1) Nuclear reactions in metal environments, where target nuclei are surrounded by conduction electrons, i.e., a degenerate electron plasma. (2) Low energy nuclear reactions in liquid metal Li, in which Li^+ ions move freely in a sea of conduction electrons, and which has a much higher density than can be realized in laboratory gas plasmas. (3) Nuclear reactions in liquid Li with ultrasonic vibration or cavitation, which has developed quite recently to provide another environment.