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Editorial from the Editor-in-Chief

Upcoming events at the Large Hadron Collider and National Ignition Facility

The scientific community is looking forward to major events this autumn, the restart of the Large Hadron Collider at CERN and the start of the National Ignition Campaign at Lawrence Livermore Laboratory.

Last year the Large Hadron Collider (LHC) was completed in a circular tunnel of 27 km in circumference, which is underground at a depth between some 50 to 175 m. The first beams were circulated successfully on 10 September 2008 but unfortunately, only a short time later, a serious fault developed and subsequently damaged superconducting magnets in one-quarter of the underground tunnel. The repair required a long technical intervention and an extended shutdown. A restart of the system is planned for September 2009. The LHC is a very complex instrument designed to reveal the secrecies of matter and to probe structures as small as 10^{-19} m at particle energies of 10 TeV. Particle physics may not seem related to topics usually reported in our journal, however petawatt laser pulses of picosecond duration may eventually be a part of a diagnostic system to detect creation and decay processes of B-mesons in the LHC (Hora & Hoffmann, 2008). The high beam intensity of the LHC however triggers the question of beam losses in high intensity particle accelerators in general (Mustafin *et al.*, 2002), and associated problems of induced radioactivity (Fertman *et al.*, 2002), and the safety of operation with ultraintense particle beams, which is a very important issue that needs to be addressed carefully (Tahir *et al.*, 2008, 2007).

The development of, the National Ignition Facility Laser at Lawrence Livermore National Laboratory, however is something that is right at the center of the interest of *Laser and Particle Beams* readers and authors. Here we witnessed a major event already in March of this year, when, NIF became the world's first fusion laser facility to break the one-megajoule barrier. NIF's 192 laser beams delivered 1.1 million joules (MJ) of ultraviolet energy to the center of its 10-meter-diameter target chamber. The accomplishment came less than two weeks after NIF first fired all 192 of its laser beams to target chamber center. During the upcoming Inertial Fusion Science and Application conference (IFSA, 6–11 September 2009), the development at NIF will be discussed in great detail and we will soon see the start of a series of experiments toward the ignition of a fusion target (Aleksandrova *et al.*, 2008; Borisenko *et al.*, 2008; Chatain *et al.*, 2008; Cook *et al.*, 2008; Imasaki & Li, 2009; Manheimer & Colombant, 2007; Seifter *et al.*, 2009; Strangio *et al.*, 2009).

In September, there is also the 13th Conference on the Physics of Non-ideal Plasmas, (PNP 13 — Chernogolovka, 13–18 September 2009). This conference continues a traditional series of meetings devoted to new theoretical and experimental results on the physics of dense non-ideal plasmas, and many of our readers, interested in dense plasma phenomena will attend this conference. In dense systems, collisions and interactions among constituents are of primary importance for the properties of the sample. Due to the high density new diagnostic tools are necessary, among them X-ray Thomson scattering (Fortmann *et al.*, 2009), and energy loss of charged particles (Li *et al.*, 2008; Nardi *et al.*, 2007).

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