

Stopping of Heavy Ion Beams in Dense Plasmas of ICF and WDM Concern

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The present status of intense and heavy ion beams in the multi MeV/a.m.u energy range and interacting with dense plasma targets at solid density with a few eV temperature is respectively timely reviewed from the heavy ion driven ICF and warm dense matter (WDM) perspectives. Experimental results obtained within SPQR (Stopping Plasma Quantitatively Reinforced)-like setups are consistently analyzed through the Standard Stopping Model (SSM) with emphasis on the dynamics of the projectile effective charge correlated to basic stopping mechanisms[I]. They are shown scalable to ICF requirements including reactor chamber transport and target heating. Further SSM theoretical refinements are also seen mandatory for the WDM experiments planned at Berkeley for low velocity projectiles fully stopped in Bragg peak vicinity, and at GSI for GeV HIB losing only a few percent of their energy in cylindrical (Laplas and Hihex) targets. Potentialities for ion production and acceleration afforded by present and planned (mostly IZEST like) PW-lasers are critically contrasted to standard linear and circular accelerating facilities of fiducial use.

[I] C. Deutsch, G. Maynard, M. Chabot, D. Gardes, S. Della Negra, R. Bimbot, M. F. Rivet, C. Fleurier, C. Couillaud, D. H. H. Hoffmann, H. Wahl, K. Weyrich, O. N. Rosmej, N. A. Tahir, J. Jacoby, M. Ogawa, Y. Oguri, J. Hasegawa, B. Sharkov, A. Golubev, A. Fertman, V. E. Fortov and V. Mintsev, *The Open Plasma Physics Journal*, 3, 88-115 (2010)

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