

Status of energy recovery, cooler and ion source experiments

M. Cavenago¹, C. Baltador¹, M. Comunian¹, A. Galatà¹, V. Variale², V. Valentino², G. Maero³, M. Rome³, P. Agostinetti⁴, V. Antoni⁴, M. Barbisan⁴, R.S. Delogu⁴, N. Pilan⁴, D. Ravarotto⁴, G. Castro⁵, L. Celona⁵, G. D'Agostino⁵, D. Dell'Olio², F. Taccogna², M. Maggiore¹, A. Ruzzon¹

¹INFN-Laboratori Nazionali di Legnaro (LNL), Legnaro (PD), Italy

²INFN-BA, and UniBa, Bari, Italy

³Università di Milano, Dipartimento di Fisica, and INFN-MI, Milano, Italy

⁴Consorzio RFX, Padua, and ISTP-CNR, Bari, Milano, Padua, Italy

⁵INFN-Laboratori Nazionali del Sud (LNS), Catania, Italy

The integrated experiment Plasma4beam2 addresses some innovative experiments in accelerator physics, in part described in this work. In neutral beam injectors (NBI) for tokamak heating or diagnostics, radiofrequency (RF) negative ion sources are used and residual ion beams (both H+ and H-) are produced; recovering their energy may improve net NBI efficiency and reduce heat load on walls. Voltage holding is also challenging. A 20 keV prototype suitable for test with TRIPS (H⁺) or NIO1 (H⁻) is being finally assembled on a test line near the former source. While NIO1, a 2MHz RF source is currently in shutdown, improved Faraday shields and Langmuir probes for it are being studied. At these low frequencies, plasma potential oscillations are difficult to compensate; plans to refurbish an RF source test stand for probes calibration are discussed, with O₂ or N₂ as process gas. Finally an RF ion cooler (where He is buffer gas) is presented, with the status of all subsystem development; for the limited RF power needed, 4 MHz is a suitable working frequency.

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