

BEAM DIAGNOSTICS AT THE RAL FRONT-END TEST STAND – FIRST RESULTS AND NEW IDEAS

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Abstract

In order to contribute to the development of high power proton accelerators in the MW range a front end test stand (FETS) is being constructed at the Rutherford Appleton Laboratory (RAL) in the UK. The aim of the FETS is to demonstrate the production of a 60 mA, 2 ms, 50 pps chopped beam at 3 MeV with sufficient beam quality. Therefore a comprehensive set of diagnostic tools have been developed or are in the design and construction phase. To improve the beam quality delivered by the Penning H⁻ ion source using a slit extraction, a pepper pot emittance measurement device and a 2D-transversal profile scanner has been built and used on the ion source development rig and results of the beam measurements will be presented. As destructive diagnostic devices suffer from the high beam power deposited on the device surfaces, two new diagnostic devices based on the photo detachment principle are under construction: A laser wire scanner allowing the reconstruction of the full 2D-transversal density distribution using tomographic techniques and an emittance scanner device. The design and status of construction of both devices will be presented and new ideas for the data analyses discussed.

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