**A Betatron Core for Optimised Slow Extraction in a Proton/Ion Medical Synchrotron**, P. AUSSET, P.A. CHAMOUARD, LNS, Laboratoire National De Saturne, CEA Saclay; L. BADANO, TERA FOUNDATION; J. BOSSER, CERN; P. KNAUS, S. ROSSI, CERN+TERA FOUNDATION - The beam quality demanded by medical synchrotrons for hadron-therapy implies stringent requirements on the spill homogeneity over the full extraction period of about one second. The use of a betatron core to optimise third-order resonant extraction appears particularly promising to satisfy these needs. This core accelerates the beam into the resonance keeping all lattice functions, and hence the resonant condition, constant which results in a very stable extraction over a broad bandwidth. Compared to small quadrupoles that are normally used to drive the resonance, the large stored energy in a betatron core represents an inherent safety feature because it is less sensitive to transients that could send large beam spikes to the patient. To complete our study, a possible implementation of a feed-forward system to correct for low-frequency ripples in the extracted beam was analysed. A mechanical and electrical betatron core design with a feed-forward system is presented. Experiments performed at the Saturne National Laboratory LNS, CEA Saclay, using the extraction betatron core 'Gephyrotron' are outlined. They confirm the utility of such a device to extract a high-quality beam for medical applications.