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Progress towards laser-driven Particle Therapy accelerators THOMAS COWAN, U. SCHRAMM, M. BUSSMANN, T. BURRIS, F. FIEDLER, S. GAILLARD, T. HERRMANNSDOERFER, T. KLUGE, S.D. KRAFT, J. MET-ZKES, R. SAUERBREY, K. ZEIL, Forschungszentrum Dresden-Rossendorf, M. BAUMANN, W. ENGHARDT, J. PAWELKE, Oncoray, TU Dresden, Germany — Recent successes in laser-ion acceleration have motivated research towards laserdriven compact accelerators for medical therapy. Realizing laser-ion acceleration for medical therapy will require adapting both the laser-ion acceleration to the medical requirements, as well as the treatment methodology to the foreseeable laser constraints. Three key scientific and technological challenges are identified: increasing laser-accelerated proton energies to 250 MeV; developing compact, strong field magnetic beam manipulation systems; and development of real-time in-vivo dosimetry to enable pulse-by-pulse active feedback and control. Progress in each of these key areas are reviewed, with special emphasis on the prospect of increasing the energy of laser accelerated protons by modifications of the Target Normal Sheath Acceleration process.

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