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Laser-driven ion acceleration at BELLA[1] JIANHUI BIN, SVEN STEINKE, QING JI, KEI NAKAMURA, Lawrence Berkeley National Laboratory, FRANZISKA TREFFERT, Technical University Darmstadt, STEPAN BULANOV, Lawrence Berkeley National Laboratory, MARKUS ROTH, Technical University Darmstadt, CSABA TOTH, CARL SCHROEDER, ERIC ESAREY, THOMAS SCHENKEL, WIM LEEMANS, Lawrence Berkeley National Laboratory — BELLA is a high repetiton rate PW laser and we used it for high intensity laser plasma acceleration experiments. The BELLA-i program is focused on relativistic laser plasma interaction such as laser driven ion acceleration, aiming at establishing an unique collaborative research facility providing beam time to selected external groups for fundamental physics and advanced applications. Here we present our first parameter study of ion acceleration driven by the BELLA-PW laser with truly high repetition rate. The laser repetition rate of 1Hz allows for scanning the laser pulse duration, relative focus location and target thickness for the first time at laser peak powers of above 1 PW. Furthermore, the long focal length geometry of the experiment (f\65) and hence, large focus size provided ion beams of reduced divergence and unprecedented charge density. This work was supported by the Director, Office of Science, of the U.S. Department of Energy under Contract No. DE-AC02-05CH11231.

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