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Probing of high density plasmas using the multi-beam, high power TiSa laser system ARCTURUS OSWALD WILLI, ESIN AKTAN, STEPHANNIE BRAUCKMANN, BASTIAN AURAND, MIRELA CERCHEZ, RAJENDRA PRASAD, ANNA MARIE SCHROER, Institute for laser and plasma physics, Heinrich Heine University Duesseldorf, D40225, Germany — The understanding of relativistic laser plasma interaction at ultra-high intensities has advanced considerably during the last decade with the availability of multi-beam, high power TiSa laser systems. These laser systems allow pump-probe experiments to be carried out. The ARCTURUS laser at the University of Duesseldorf is ideally suited for various kinds of pump-probe experiments as it consists of two identical, high power beams with energies of 5J in 30 fs and a third beam for optical probing with energy of 30mJ in a 30fs pulse. All three beams are synchronised and have flexible time delays with respect to each other. Several different processes were studied where one of the beams was used as an interaction beam and the second one was incident on a thin solid gold foil to generate a proton beam. For example, thin foil targets were irradiated either with a linear or circular polarized pulse and probed with protons at different times. The expansion of foils for the two cases was clearly different consistent with numerical simulations. In addition, the interaction of gas targets was probed with protons and separately with an optical probe. With both diagnostics the formation of a channel was observed. In the presentation various two beam measurements will be discussed.

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