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**Physics of hyper-velocity impacts of micrometer and sub-micrometer sized particles** ANNA MOCKER, IRS, University of Stuttgart, Germany, KLAUS HORNUNG, Universitaet der Bundeswehr Muenchen, Germany, ZOLTAN STERNOVSKY, KEITH DRAKE, SASCHA KEMPF, CCLDAS, University of Colorado at Boulder, EBERHARD GRÜN, MPI-K, Heidelberg, Germany, FIEGE FIEGE, University of Heidelberg, Germany, RALF SRAMA, IRS, University of Stuttgart, Germany — The phenomena occurring during hypervelocity microparticle impact are manyfold and the basis for the variety of applications. The processes of interest are particle fragmentation, impact ionization, impact flashes, and TOF mass spectrometry. To relate the parameters of individual particle impacts with the resulting measured values, a comprehensive program of impact experiments under well known experimental conditions for a wide variety of impact parameters is needed. For this, dust particles are accelerated to hypervelocity speeds with an electrostatic accelerator and the resulting plasma cloud is analyzed with suitable instruments. A detailed investigation using latest analyzing techniques like high-speed cameras and sensitive high-resolution spectrometers promises new instrument concepts and insights into short timescale high-pressure states of matter. Linear TOF mass spectroscopy provides the opportunity to measure the dynamic and thermodynamic properties of the impact ions. Together with a deeper theoretical understanding of the impact process and the subsequent expansion and other experimental approaches, this method can be a powerful tool to investigate the state of the hot compressed matter due to the related residual ion species.

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