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Status of the KALDERA drive-laser development for a next generation high repetition rate laser plasma accelerator

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During recent years DESY has strengthened its effort to evolve laser plasma acceleration technology from demonstration experiments towards reliably running machines. In this framework we develop the Ti:Sapphire based drive-laser KALDERA which is supposed to deliver up to kHz repetition rates at more than 100 TW of peak power in its final phase. Since current drive-lasers operate at the low Hz-level, this new system finally supports fast active stabilization which is key to also directly improve the LPA's electron stability that is required to run a facility.
In this presentation we will report on the completion of our first development phase: our laser is currently generating 750 mJ of pulse energy at 100 Hz repetition rate and has been operated over weeks. We will discuss crucial technological challenges that had to be mastered during the development and highlight special features of this unique laser system. Moreover, we will show the latest results from the pulse compression campaign where an MLD-grating compressor based on an out-of-plane geometry is utilized to reach down to the 30 fs-regime. Finally, we will comment on the next development phases and status to further scale the average power of the KALDERA laser towards the kW-range.

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