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Paving the way for CW kHz operation of a discharge capillary in the DESY ADVANCE lab

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Discharge capillaries are an essential plasma-source for a wealth of different applications in plasma-based accelerators. The long, uniform plasma profiles have been pivotal in both LWFA and PWFA experiments alike. The repetition rate of such sources has been limited to 1-10 Hz, far below the required 10 kHz to MHz of a plasma-based collider or FEL. Development of high repetition rate discharge capillaries is imperative for these and other future applications and is currently being performed in the ADVANCE laboratory at DESY. Our initial goal is to achieve the milestone of continuous, stable, 1 kHz operation from which higher repetition rates might be achieved. A summary of the work being performed towards this goal is presented here.

Primary author: JONES, Harry (DESY)

Co-authors: GARLAND, Matthew James (DESY); KOTTLER, Sandra (DESY); LEDERER, Sven (DESY); LOISCH, Gregor (DESY); LUDWIG, Kai (DESY); OBIER, Frank (DESY); PARIKH, Trupen (DESY); PODER, Kristjan (DESY); SHAL-LOO, Rob (DESY); SVENSSON, Jonas Björklund (DESY); D'ARCY, Richard (DESY); OSTERHOFF, Jens (DESY)

Presenter: JONES, Harry (DESY)

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