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Possible experiments using dielectric-loaded waveguides on the ARES linac

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The ARES S-band linac, intended to be started at the beginning of 2018, will be the central part of the SINBAD (Short and INnovative Bunches At Desy) platform at DESY and aims to be a test bench for various types of novel acceleration schemes (plasma, THz, optical, etc.). In this paper, we present experiments using dielectric-loaded waveguides (DLWs) which are intended to be performed on the ARES linac. These experiments first aim at gaining experience for the AXISIS project, by testing the transmission of a low energy (lower than 5 MeV) electron bunch with a few pC of charge through a DLW and by proving the possibility of a significant energy gain (higher than 1 MeV) in a DLW driven by a multicycle THz pulse. The experiments also aim at using the DLWs as diagnostics devices for fs bunch lengths measurements (passive streaking by bunch-induced transverse wakefields, tomographic reconstruction using bunch energy spectra, etc.).

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