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Overview and performance of the MAST Upgrade Neutral Beam Injectors.

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The MAST Upgrade machine is equipped with two Neutral Beam Injectors, which deliver on- and off-axis deuterium neutral beam power to the tokamak plasma. The injectors are based on filament driven arc discharge ion sources (Positive Ion Neutral Injectors, PINIs) in "supercusp"filter field configuration with a maximum design deuterium beam voltage and current of 75 kV and 65 A, respectively. The injectors have been operating since 2020 after undergoing major upgrades to the beamlines and power supplies to fulfil the operational requirements of pulse lengths up to 5 s and off-axis injection. In this contribution an overview of the beamlines and ion sources is presented and the performance and operational experience with pulse lengths of up to 1 s and total average power of 3 MW discussed. Future improvements to the system, with emphasis on the ion source power supplies, for reliable operations at higher power and longer pulse lengths are outlined.

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