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Novel Neodymium MOPA fiber laser for Strontium atom cooling

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We present the first step in the development of a stable fibered laser system operating at 461 nm for the laser cooling of Strontium atoms on the 1S0-1P1 line. This project fits in a long-term activity towards the development of a new generation of highly sensitive atom interferometers based on single photon transitions. This new development will particularly benefit to large-scale instruments based on atom interferometry, such as the Matter-wave laser Interferometry Gravitation Antenna (MIGA project).

The first stage of the laser consists in a 3W source at 922nm by using a MOPA configuration. For this purpose we use a special neodymium doped fiber, which strongly suppresses the 1060 nm amplification. We already demonstrated a non-single frequency laser output power of 2.5W, and are now focused on the generation of the 922nm radiation in in single frequency operation. The second stage of the laser system consists in the frequency doubling to obtain the 461 nm wavelength. For this propose we aim to develop a resonant doubling cavity in collaboration with industrial partners.

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