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Diamond-based Raman laser technology for RILIS

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The Raman nonlinear process consists in a scattering interaction between light and a crystal. Through the process, light losses energy to a phonon of the crystal, leading to an up-shift in the laser wavelength. This wavelength shift can be used extend the laser frequency covered by the RILIS system, and hence improve its versatility.
During the past years, different laser designs have been tested, and characterized.
Particularly, a Z-fold diamond laser has been implemented which conserves the pump laser's linewidth, making it suitable for regular RILIS operation. Recently, the use of this design has been validated in MEDICIS with the ionization of Radium, for which the first step frequency of the laser scheme is difficult to achieve with TiSa lasers.
A second design provides narrow linewidth, suitable for high-resolution spectroscopy, for example with PI-LIST or other high-resolution laser spectroscopy experiments. Characterization is ongoing to study the most suitable configuration for on-line application in the near future.

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