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Intracavity generation of tripled Ti:Sa laser pulses

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To efficiently laser-ionize many different elements, the spectral range of the Ti:Sa lasers at ISOLDE RILIS is extended with nonlinear processes of second-, third- and fourth harmonic generation (SHG, THG and FHG). We present a technique to intracavity generate ns pulses in the tripled Ti:Sa range (˜ 230nm –310nm) with a Gaussian beam shape and a size comparable to that of the fundamental Ti:Sa output. By generating the 3rd harmonic inside the cavity of the Ti:Sa, the need for tedious beam shaping, which is required in single-pass THG outside the laser cavity, is eliminated.
The setup is less complex than the usual single-pass THG and requires less space since it is located inside the Ti:Sa cavity. Similar performance to that of external frequency conversion has been achieved and a direct comparison of the technique will be presented.
We discuss long-term stability, wavelength tuning behaviour and linewidth, as well as future potential with bespoke optics.

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