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Intracavity generation of tripled Ti:Sa laser pulses

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 ($\sim 230\text{nm} - 310\text{nm}$) 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 no additional 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 techniques will be presented.

Author: WESSOLEK, Julius (CERN / University of Manchester)

Co-authors: BERNERD, Cyril (CERN); CHRYSALIDIS, Katerina (CERN)

Presenter: WESSOLEK, Julius (CERN / University of Manchester)

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