

Developing Ti: Sa laser systems for REGLIS³



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Outline

- What is S^3 ?
- What is REGLIS³ and how does it work?
- The laser systems at REGLIS³.
- Laser Spectroscopy by REGLIS³.
- My project.

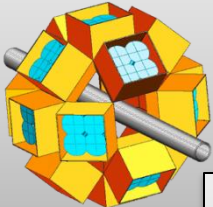


Super Separator Spectrometer

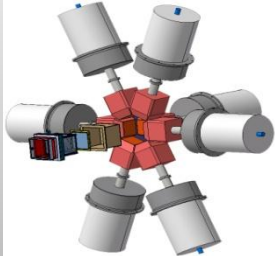
Primary beam



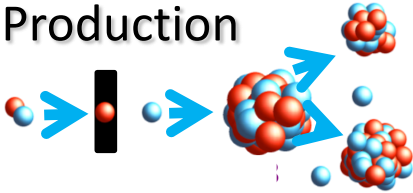
In-beam spectroscopy
Two step reactions
 EXOGAM2
 PARIS
 AGATA
 MUST2/GASPARD



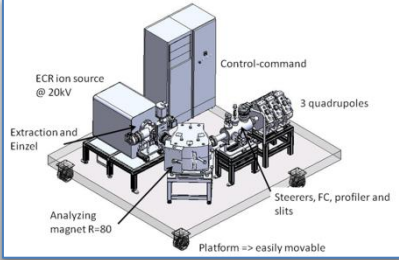
Delayed spectroscopy
SIRIUS setup
 Implantation-decay station at the mass dispersive plan



Production



Atomic physics
FISIC setup
 Fast Ion Slow Ion Collisions
 Electron exchange

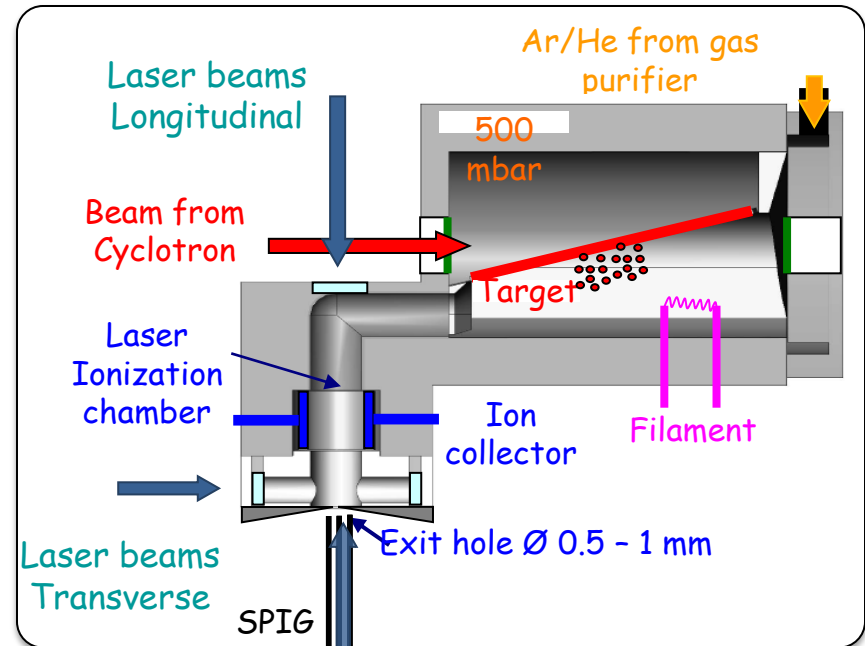
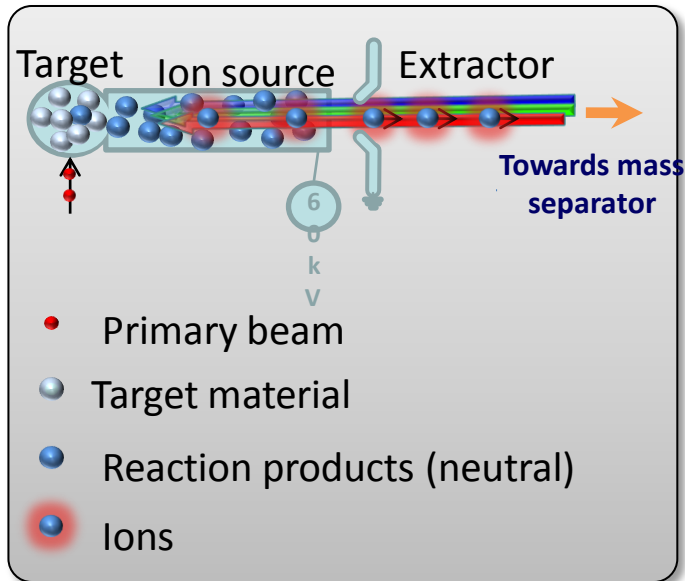


Ground state properties
(mass, size, moments, spins)
REGLIS³ setup
 Low Energy Branch



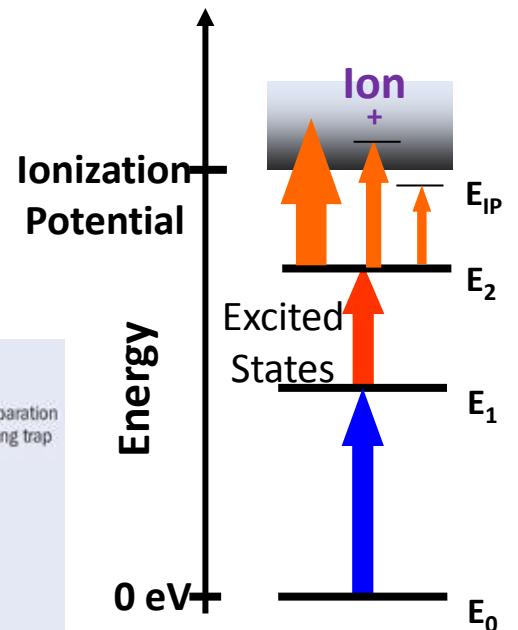
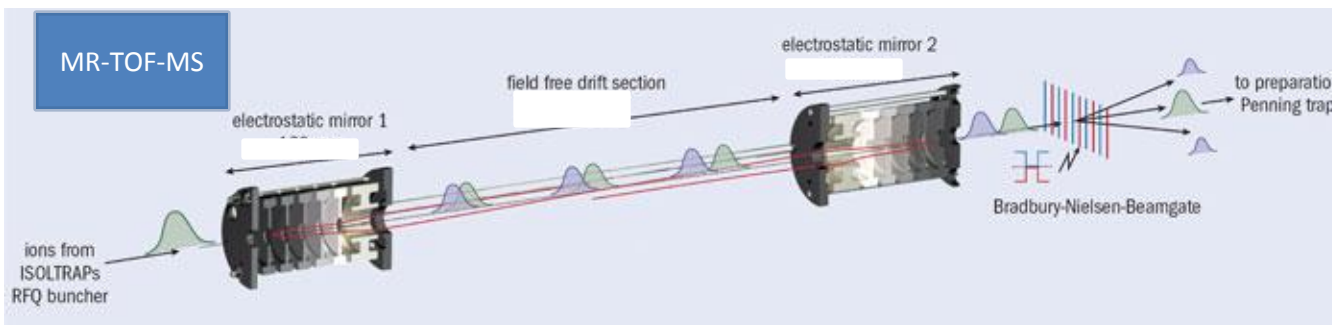
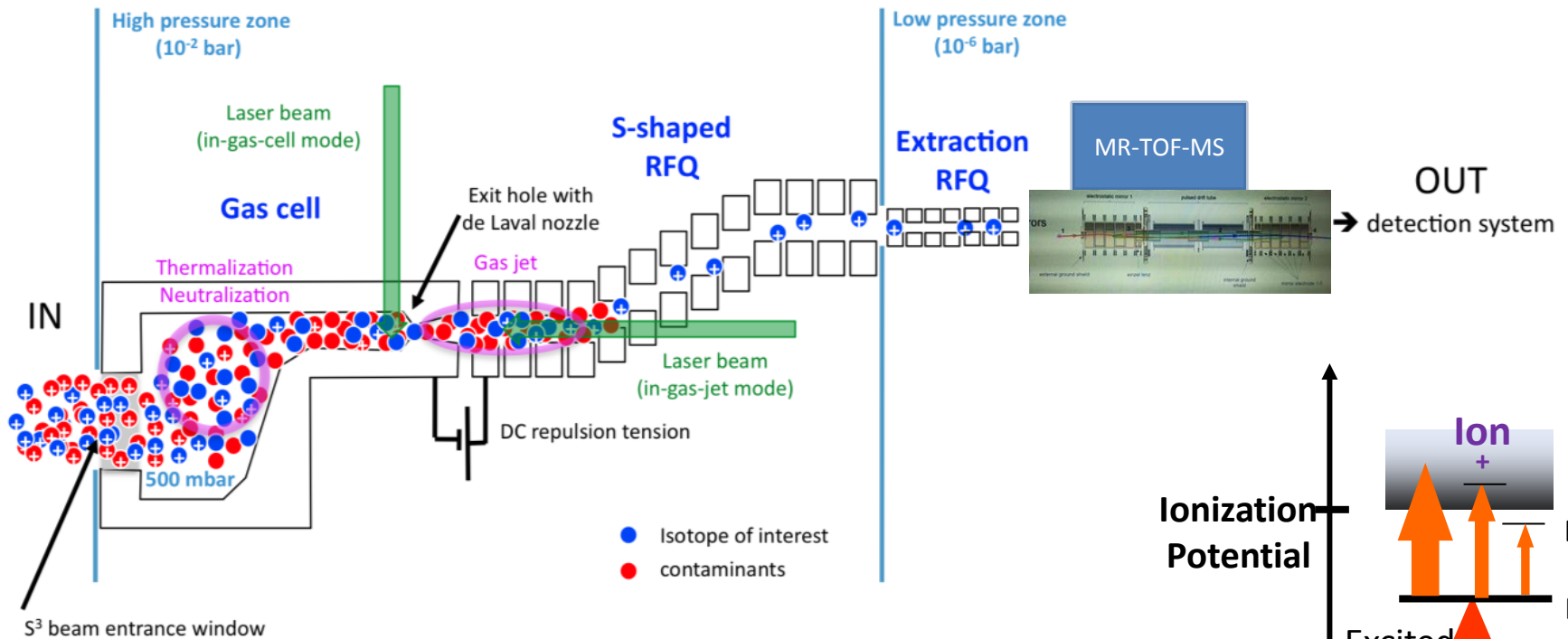
DESIR

In Gas cell or in Hot cavity tube?

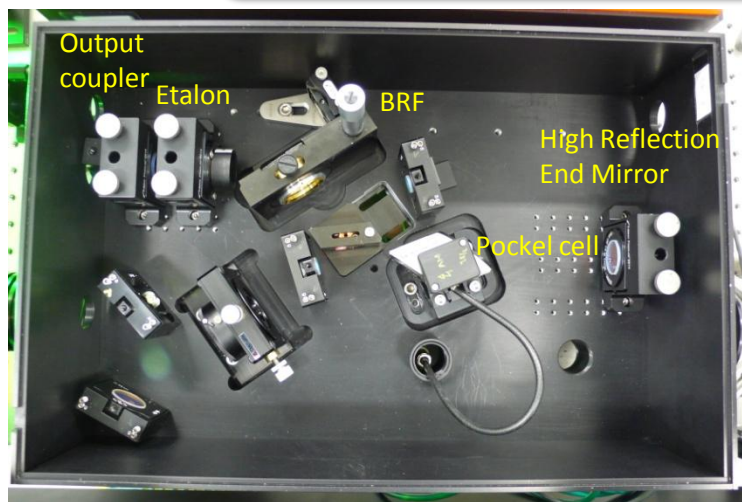
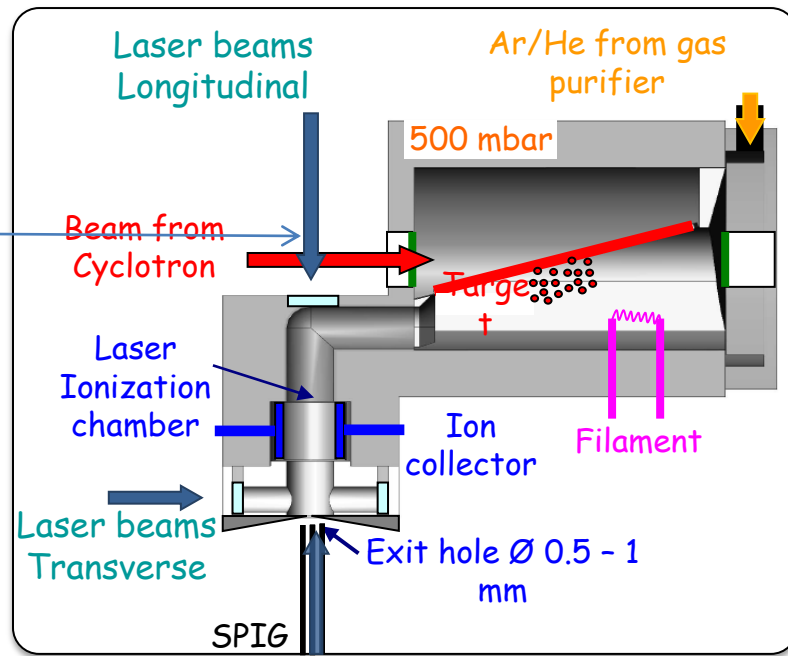
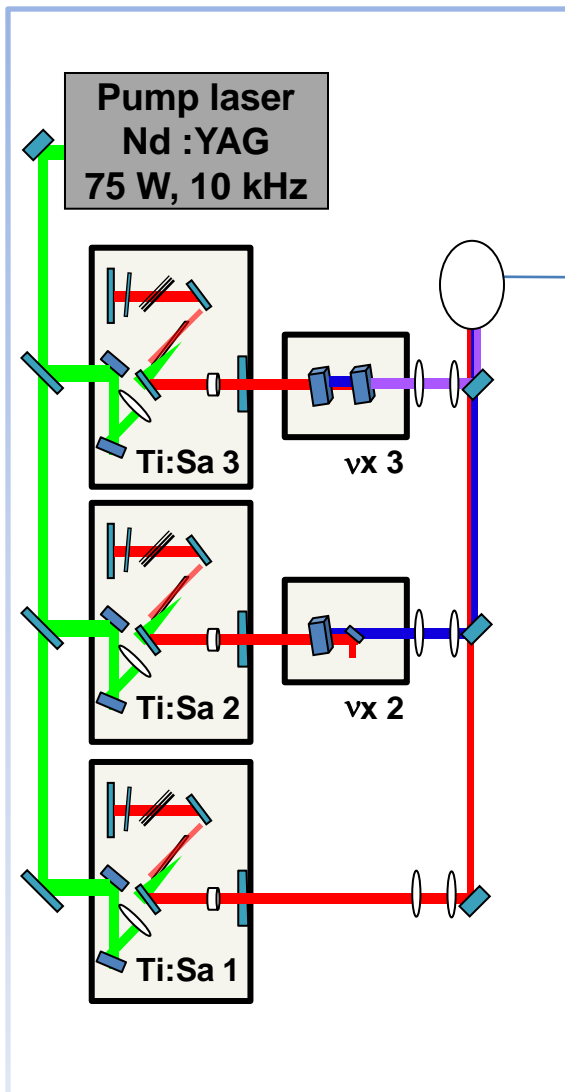


	Hot cavity	In Gas cell	In Gas jet
Typical residence time	10 μ s	25 - 100ms	10 μ s
Laser system repetition rate	10kHz	200Hz	10kHz
Doppler broadening @ 2500K / Pressure Broadening	~5 GHz	~6 GHz	~200 MHz

REGLIS³ (Rare element in Gas Laser Ion Source at S³)



Laser systems at REGLIS

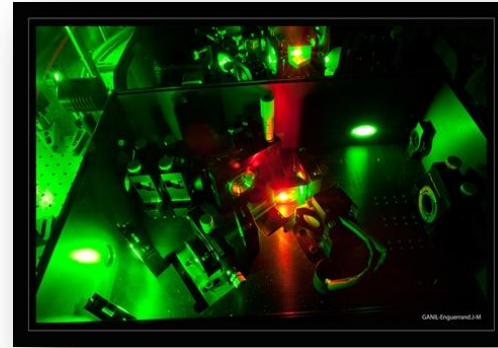


3 Tunable Ti: Sa Cavities:

$680 \text{ nm} < \lambda < 1000 \text{ nm}$

Nd:YAG pumped (532nm)

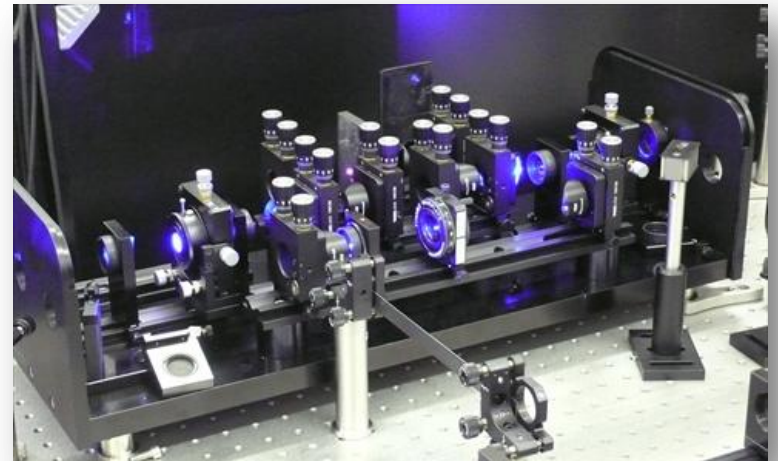
From GISELE at GANIL



1 Grating Ti: Sa laser:

continuous wide range tuneability

TRIUMF Collaboration (Vancouver, Canada)



2 Frequency Conversion Cavities:

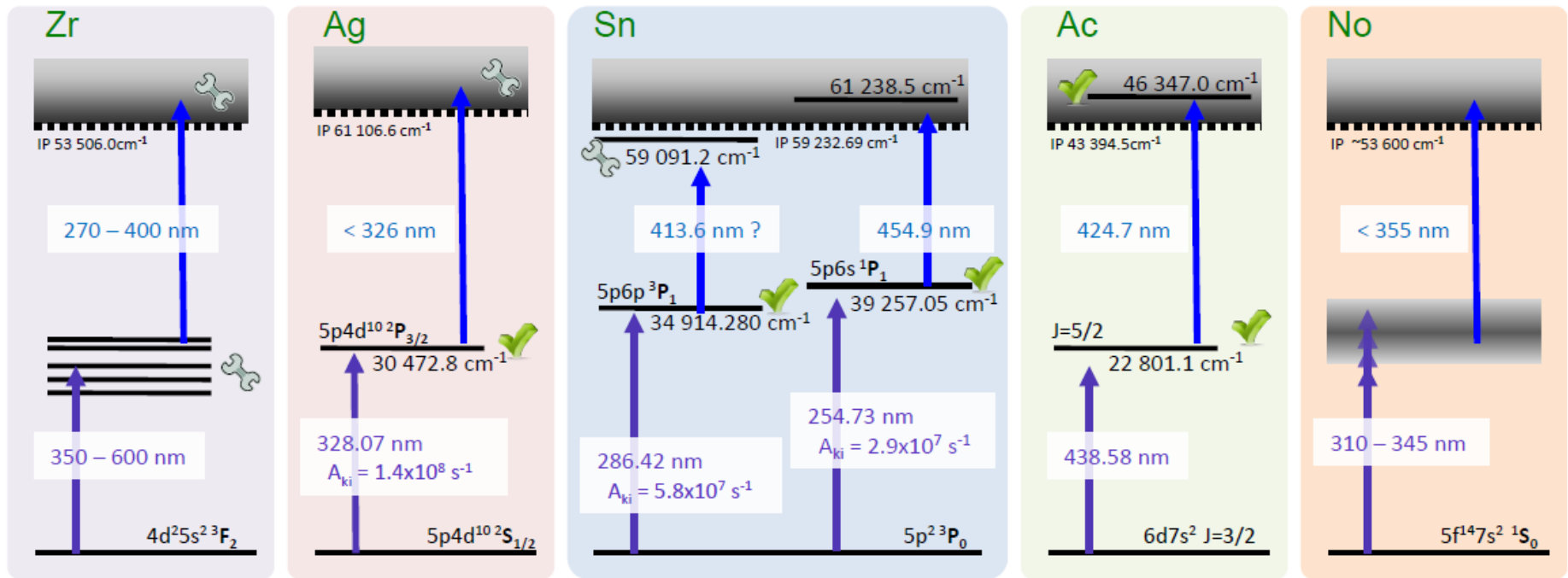
SHG: $350 < \lambda < 470 \text{ nm}$ ($\sim 1 \text{ W}$)

THG/QHG: $210 < \lambda < 330 \text{ nm}$ ($\sim 200 \text{ mW}$)

Mainz University Collaboration (Germany)

Laser spectroscopy by REGLIS

2 steps ionisation laser spectroscopy list for Ti: Sa
from Sebastian Raeder document



My Project

Three Ti: Sa cavities with manual scan of wavelength →

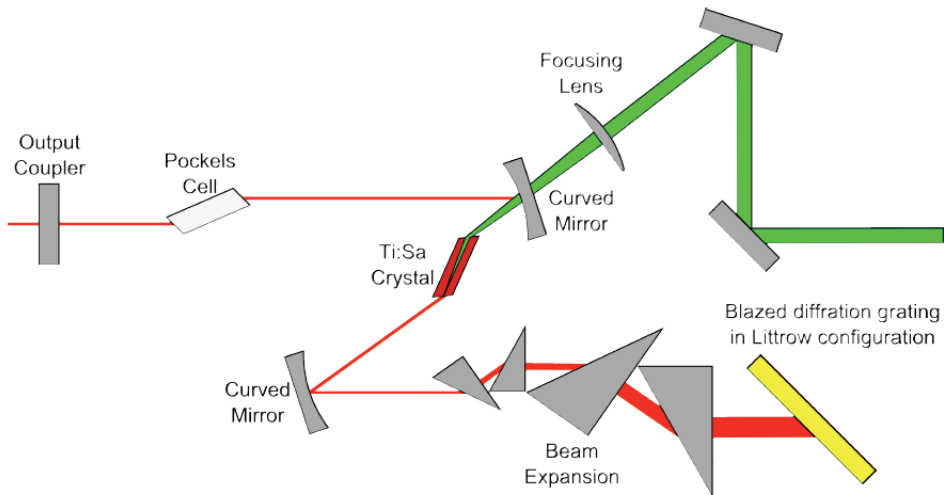
Automatic scan → motorization of etalon.

Etalon

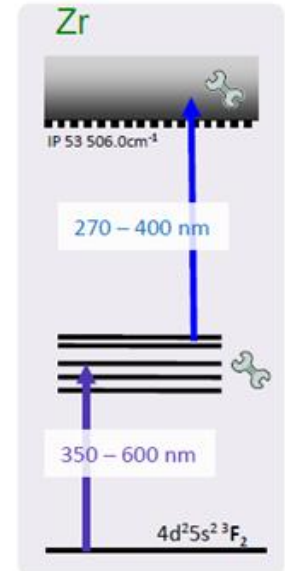


One grating laser with manual tuning →

Rotation of grating → BBO crystal (doubling or tripling).



BBO Crystal



Controller



Conclusion

- Production of RIB with high efficiency by REGLIS.
- First On-line setup for laser spectroscopy at GANIL will be possible.
- Physics is the spirit and soul of all sciences so let's keep on research for a better world.

Thanks for listening

RILIS (Resonant Ionization Laser Ion Source)

