

RESEDA Resonant Spin Echo for Diverse Applications

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Instrument Description & Typical Applications

Neutron source:
Maximum neutron flux density: $8E14$ Neutrons/cm²/s
Output Power: 20 MW

Field subtraction coil:
Total wire length: 1334 m
Serial resistance: 14.6 Ω
Field integral at 2.2 A: 74.32 Gm

Guide fields with neutron guide:
Guide field strength: several Gauss
Neutron guide coating: $m=1.2$

CASCADE Detector:
8 ¹⁰B covered foils
pixel size: 1.56 mm
Time resolution: 100 ns
Vacuum-proof

V - Cavity Polarizer:
Double V - Cavity length: 2 m
Mirror coating: $m=5$

Wavelength / Velocity selector:
Rotational speed: up to 28000 rpm
Wavelength range: 3.5 – 22 \AA
Tilt angles: $\pm 10^\circ$

Resonant Flipper: Superconducting B_0 -coil: maximum field of 300mT
RF coil frequencies: up to 3.6 MHz
Maximum field integral: 0.5 Tm

$f = 3.59\text{MHz}$
 $\lambda = 6 \text{\AA}$

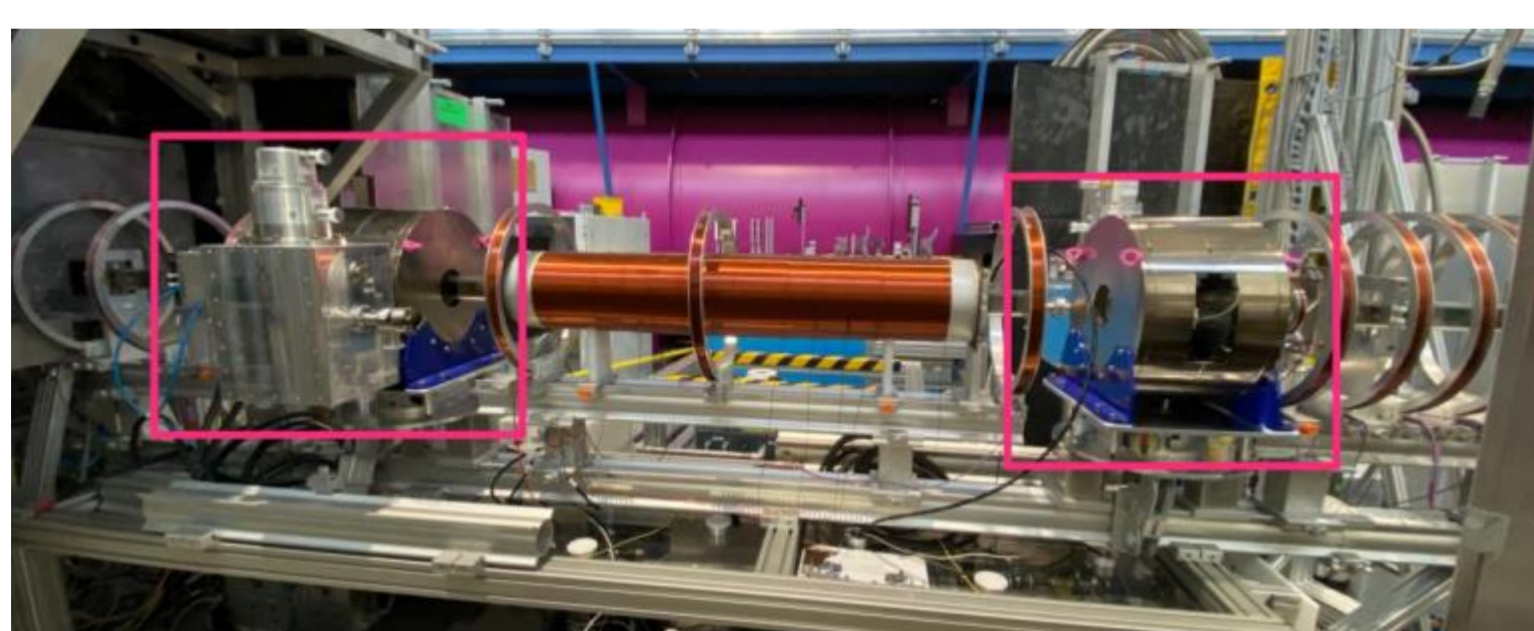
cts/mon (a.u.)

B_0 (mT)

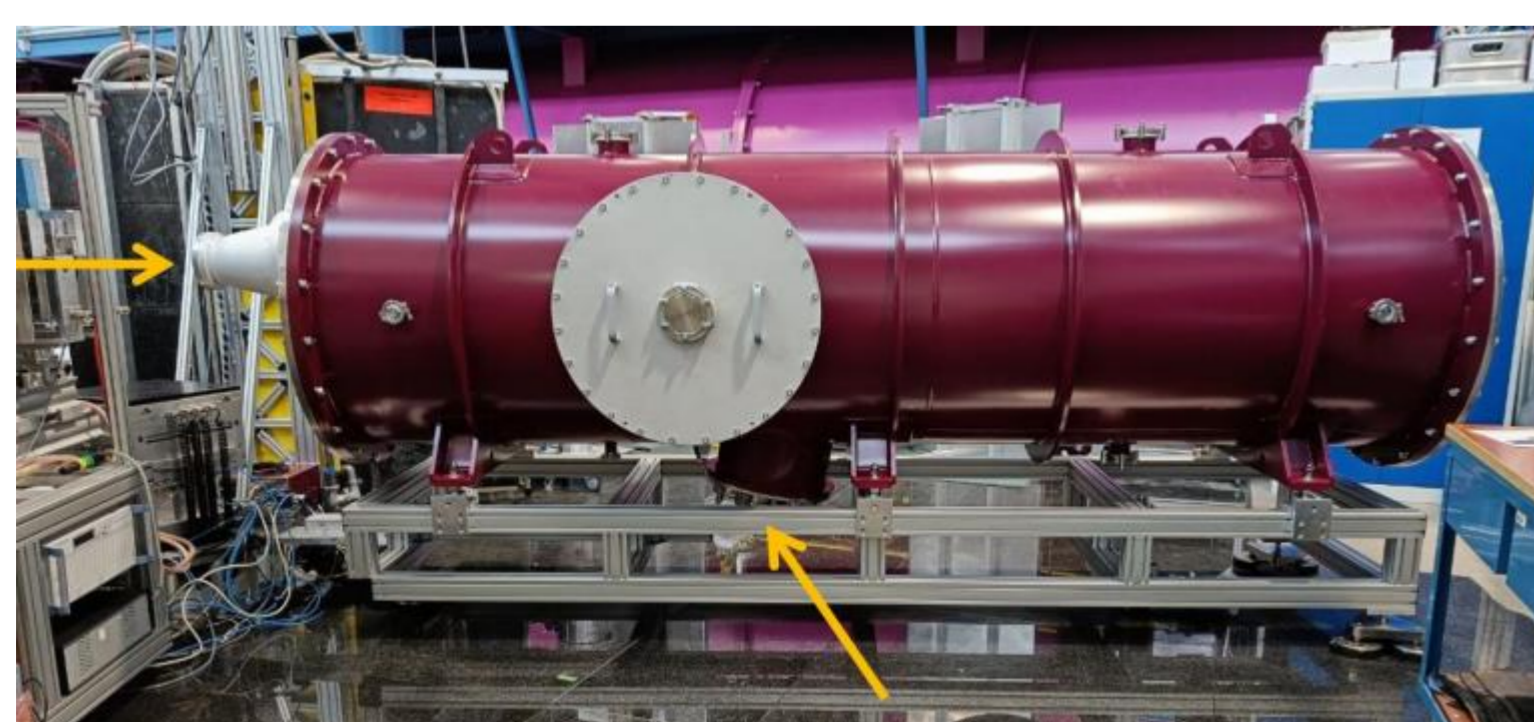
Sample Table with 2.2T horizontal magnet: The table offers x-, y-, and z-translation, x- and y- cradle as well as z-rotation

Recent Upgrade & Future Developments

MIASANS Upgrade



New Superconducting, static field coils with rotation stages
→ increased Energy resolution at 300mT and 8 \AA :
 $\tau_{\text{max}} = 110\text{ns}$



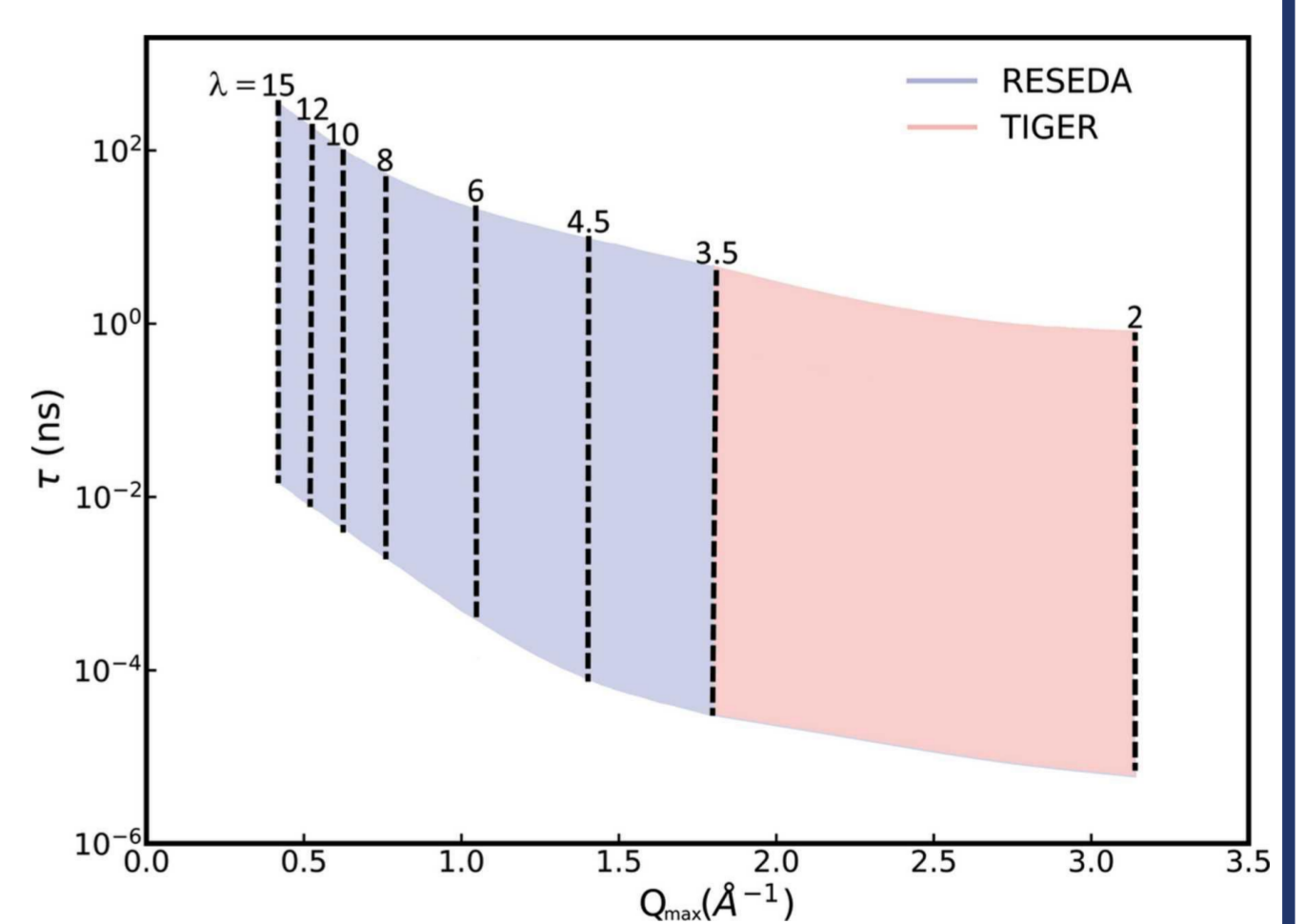
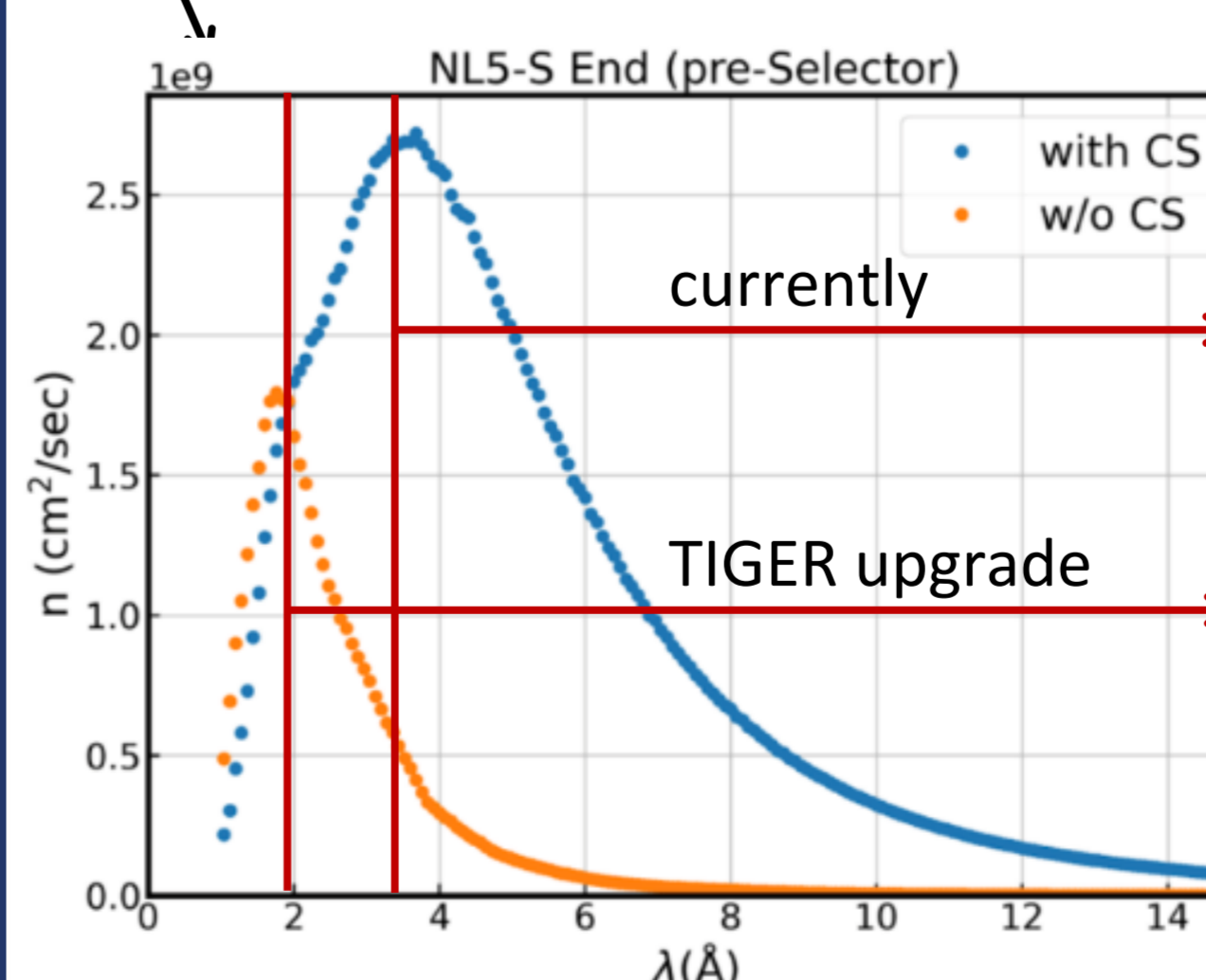
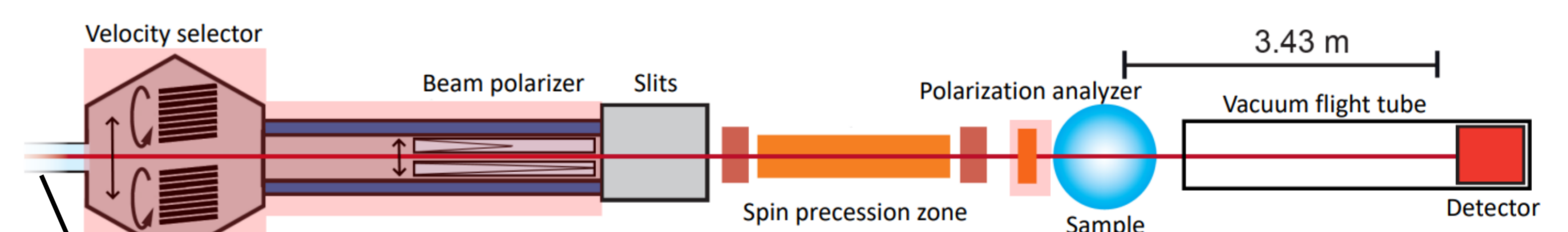
MIASANS detector tank
→ reduces background due to reduced air scattering
→ greater flexibility due to variable detector distances from the sample.
→ designed for the use of a larger detector in the future
→ variable beam stops with allow access to smaller Q



Vacuum proof detector housing with refurbished detector



TIGER Upgrade



Extending the measurement capabilities of RESEDA towards thermal wavelengths
→ Larger momentum transfer Q
→ Larger energy transfer (smaller τ)
e.g.: 2 \AA → $\Delta E_{\text{max}} = 2.05\text{meV}$
 $Q_{\text{max}} = 3.14\text{\AA}^{-1}$
 $\tau_{\text{max}} = 0.85 \text{ ns (QE: } 7.23\mu\text{eV)}$

New Science:
→ Ground states without LRO
→ H & Li Dynamics
→ Low lying CEF
→ AFM Spintronics

