# Charge breeding of radioactive ions in the ECRIS at ISOLDE

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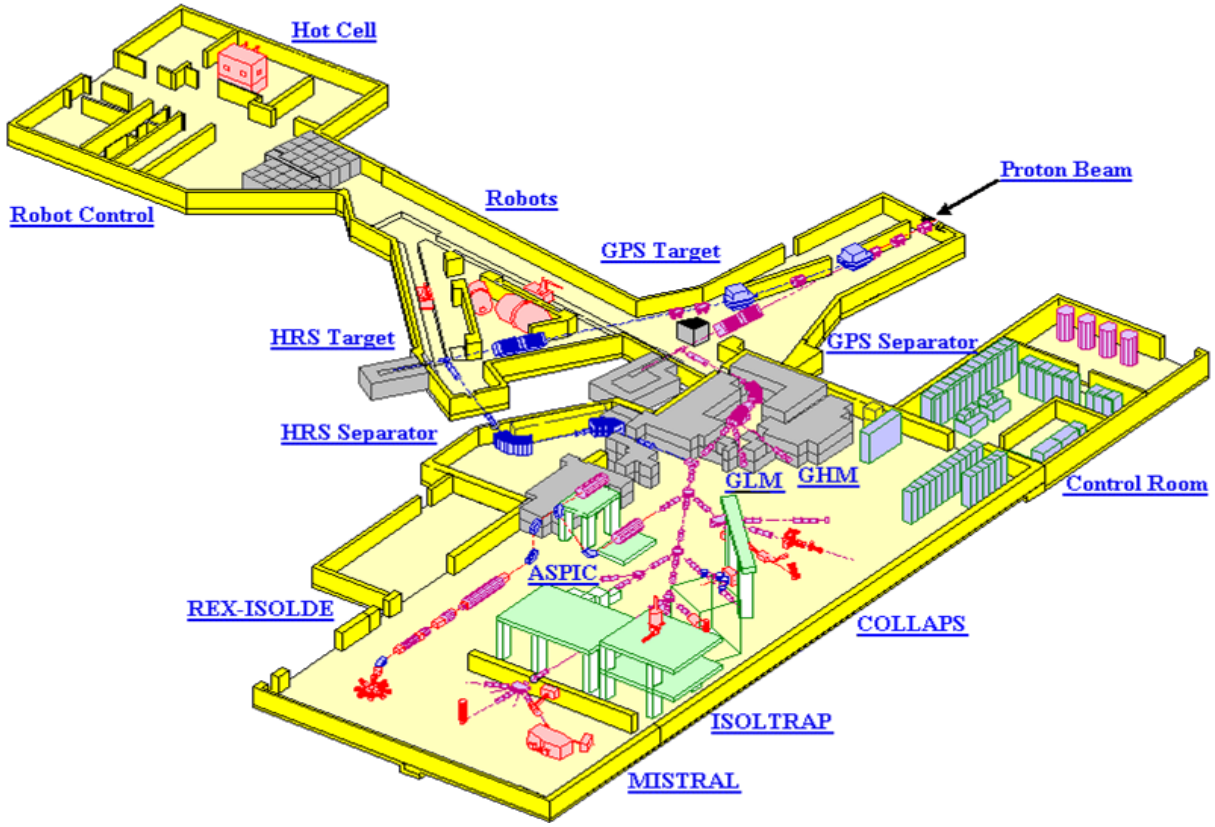
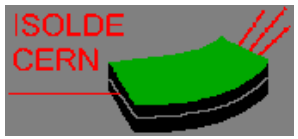
# The ISOLDE facility




# What is charge breeding?

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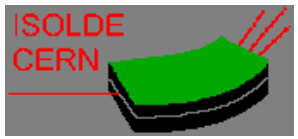
- Simply: "ionization of ions"; changing charge state from $m+$ to $n+$, where $n > m$.

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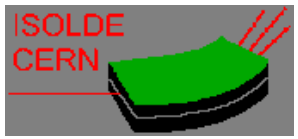


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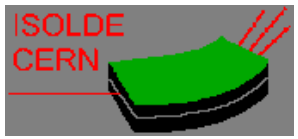


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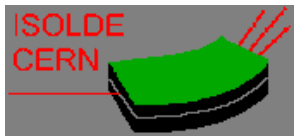
- Efficiency of charge breeding process depends on device used and type of isotope bred




# The ECR ion source

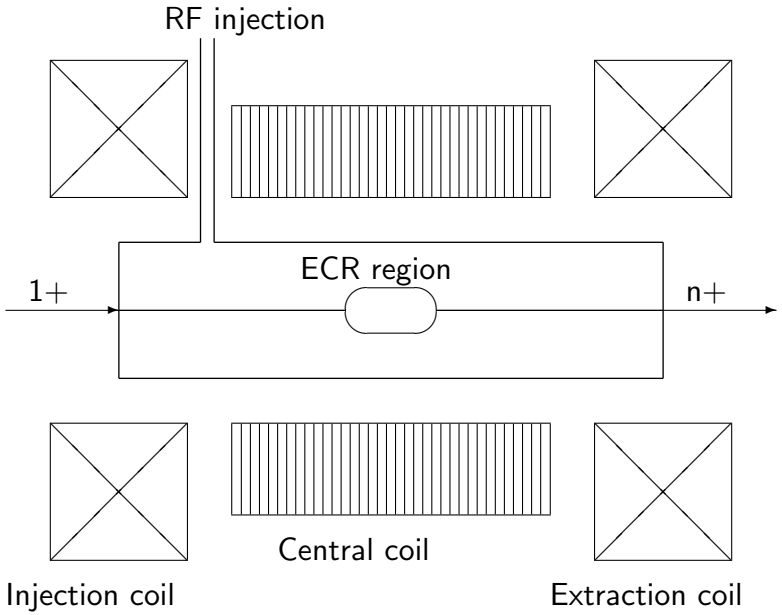



Figure 1: Schematic picture of the ECRIS at ISOLDE (cutaway view)

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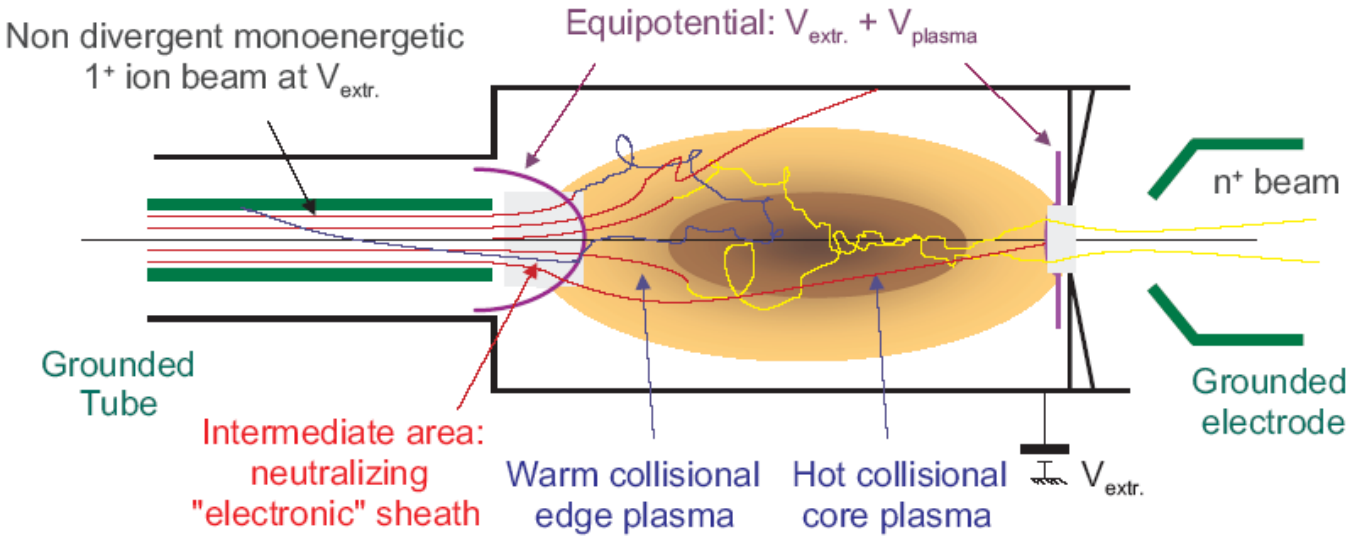


(Picture taken from CERN/INTC 2001-023, INTC/P-143)

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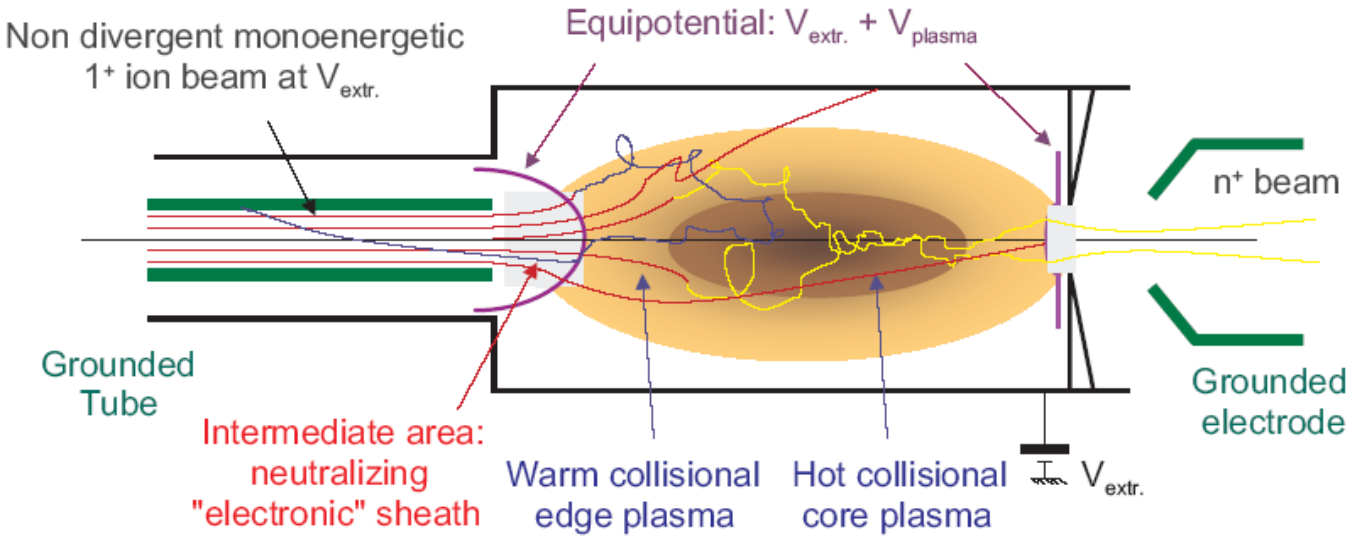


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- Resonance criterion(for electrons): $\omega = \frac{eB}{m_e}$

# ECRIS setup at ISOLDE

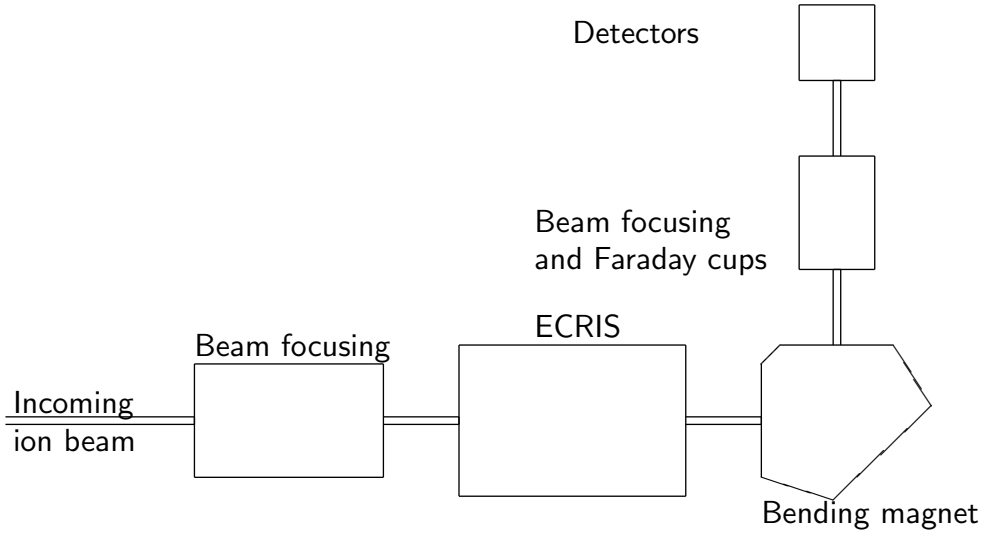


Figure 2: Schematic overview of the ECR ion source setup at ISOLDE


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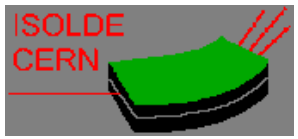


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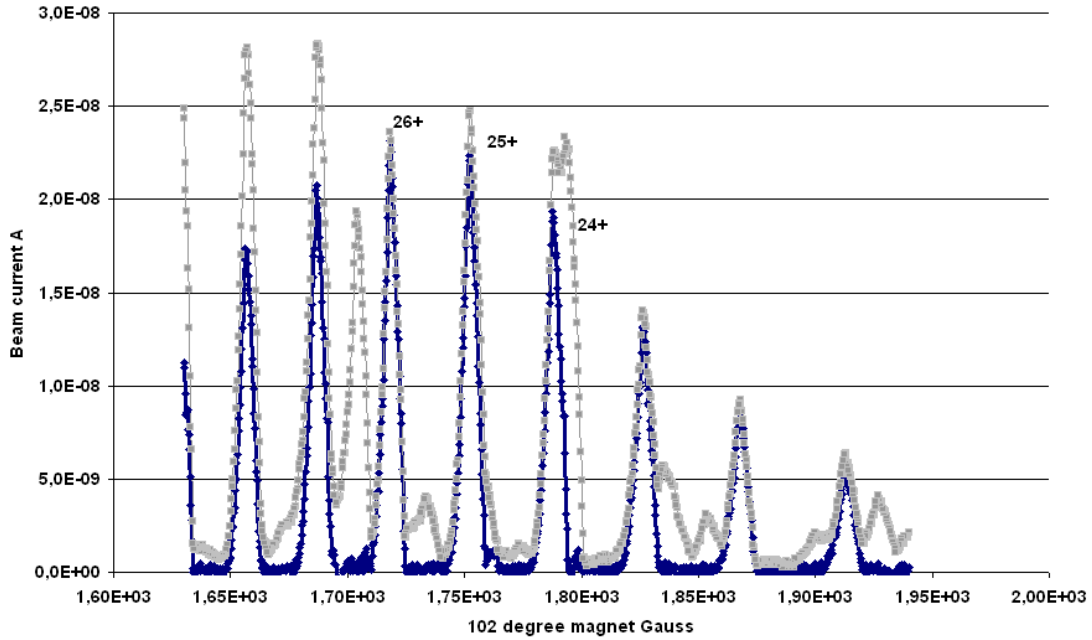
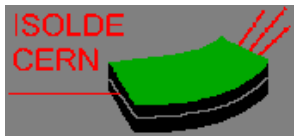
- "Washing" of beams
  - Different charge-breeding efficiencies for different isotopes $\longrightarrow$ increase in the relative abundance of rare isotopes

# Some results

Charge state distribution of $^{235}$U




(data from June 18th 2004)

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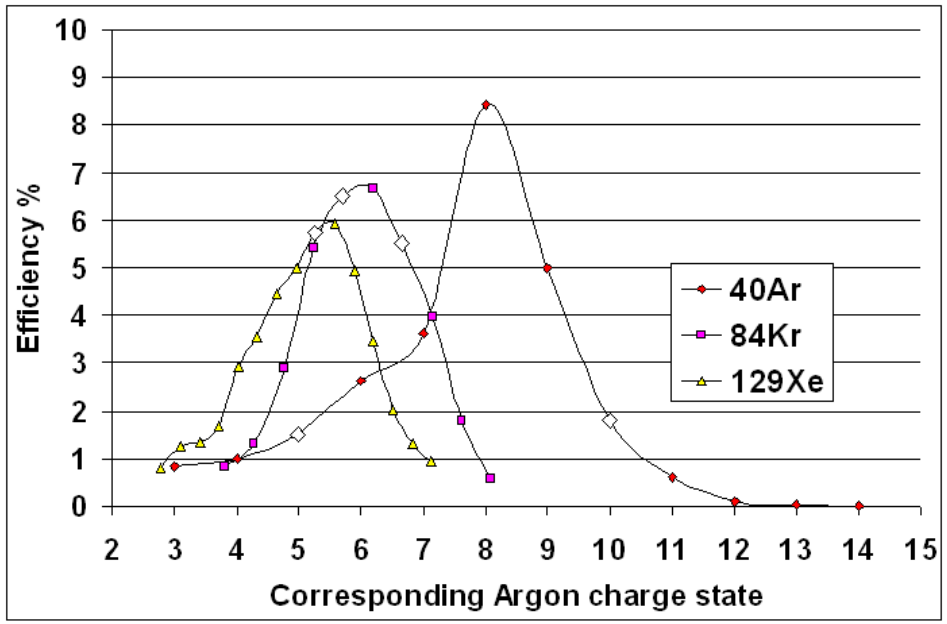
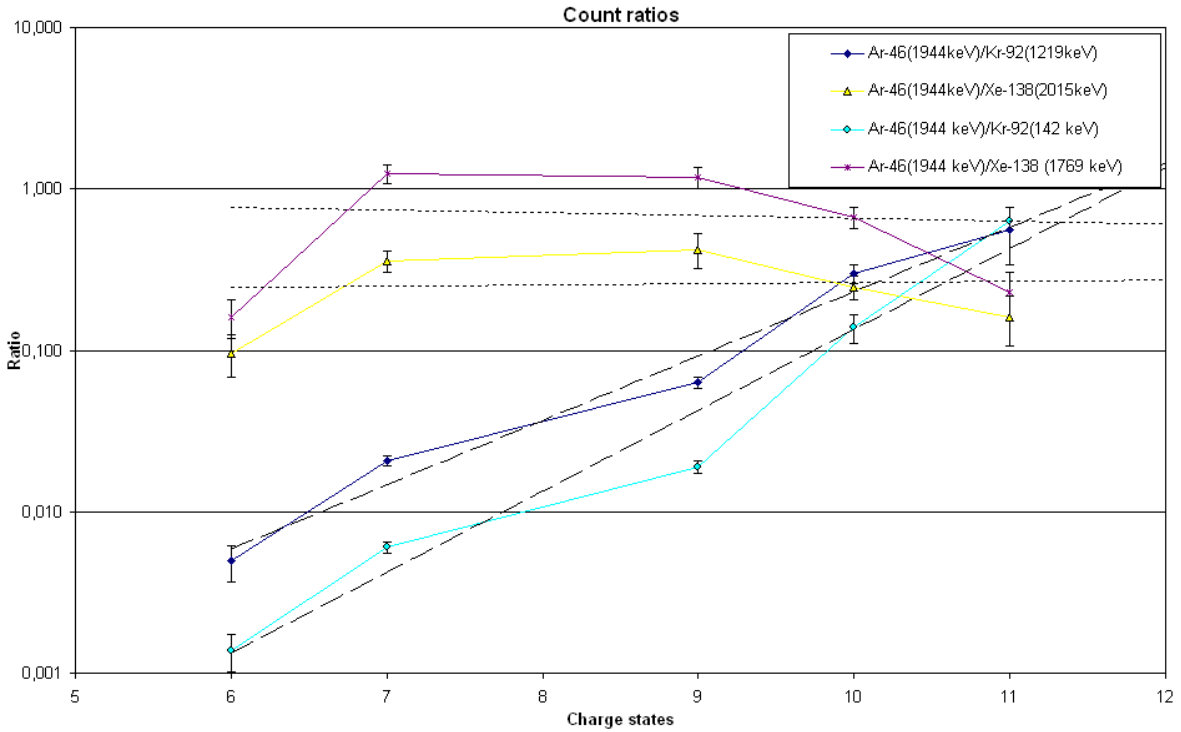
Washing of beam: charge state distributions for $^{40}$Ar, $^{84}$Kr and $^{129}$Xe.




(data from July 27th and July 29th 2004)

# Some results

Washing of beam: ratios of isotopes $^{46}$Ar to $^{92}$Kr and $^{138}$Xe.




# The last slide...

Thank you for your attention!

...any questions?