

## Ion beams at GANIL

CIRIL operates beam lines and specific equipment (spectrometers, irradiation devices etc) in the whole ranges of available ion species and beam energies :

- **High energy** Carbon to Uranium 95 to 25 MeV/A
- **Medium energy** Carbon to Uranium 13.6 to 4 MeV/A
- **Injector cyclotrons** Carbon to Uranium 1 to 0.4 MeV/A
- **ECR ion sources** Helium to Uranium 0.5 to 25 q.keV

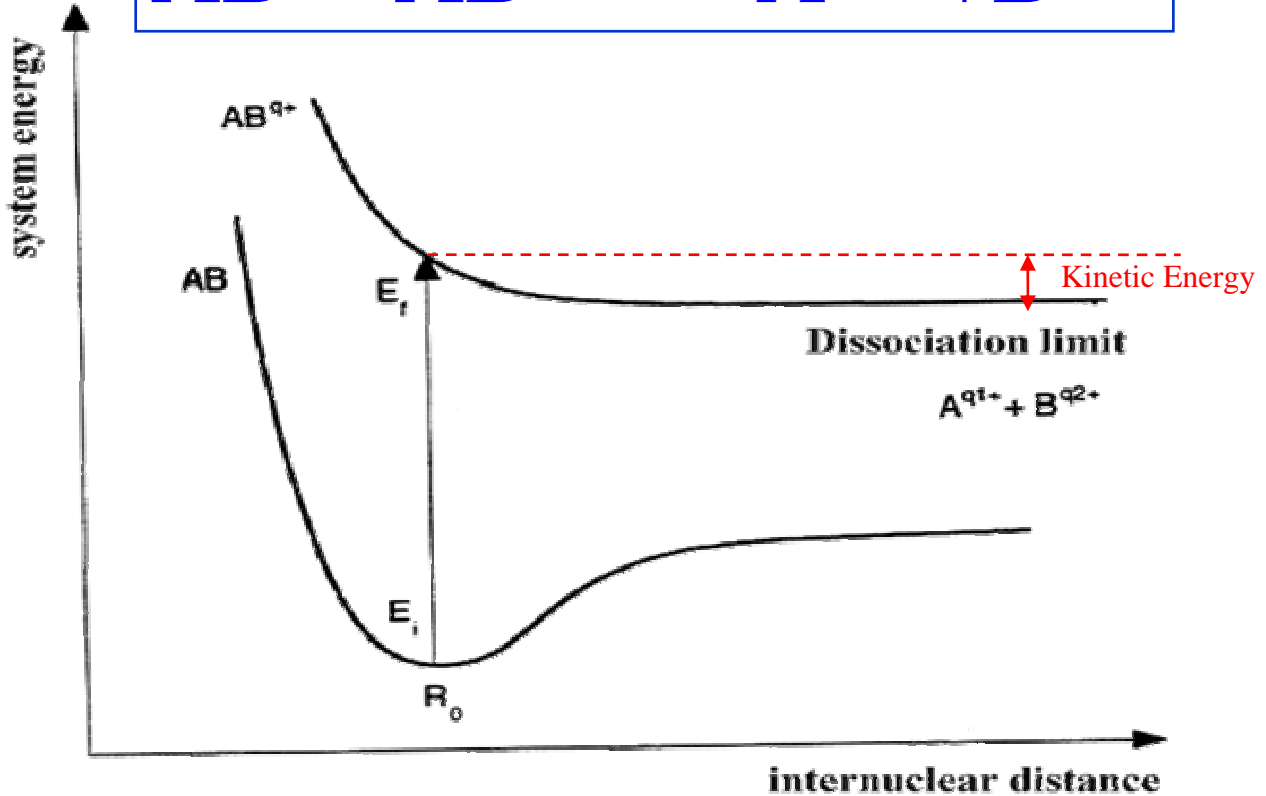
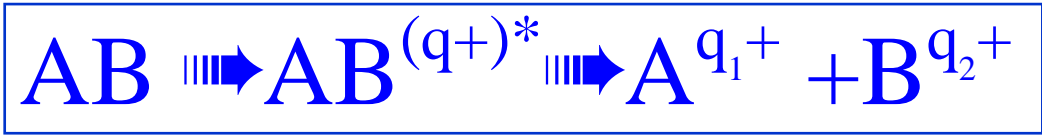
At ECR ion sources, a line specifically designed for the production of very low energy ion beams (down to a few q.eV) will be implemented in the forthcoming months.

## Atomic and Molecular Physics group at CIRIL

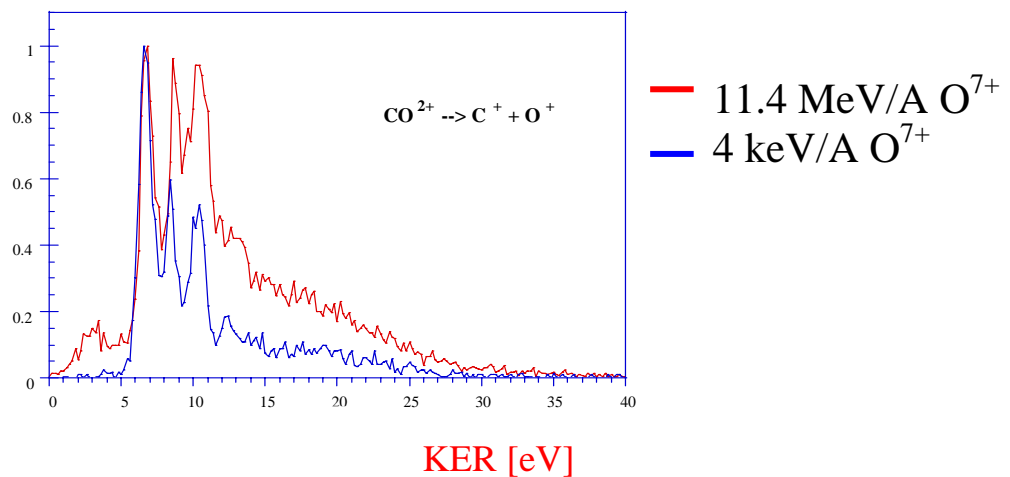
L. Adoui	Scientist	P. Boduch	Scientist
<b>A. Cassimi</b>	Scientist	J.Y. Chesnel	Scientist
G. Cremer	Scientist	F. Frémont	Scientist
D. Hennecart	Scientist	B. Huber	Scientist
X. Husson	Scientist	H. Rothard	Scientist
B. Manil	Postdoc	M. Tarisien	Postdoc
G. Allio	Phd Stud.	G. Laurent	Phd Stud.
S. Legendre	Phd Stud.	G.Ntamak	Phd Stud.
P. Sobocinski	Phd Stud.		



# APPLICATION OF RIMS TO THE STUDY OF MOLECULAR FRAGMENTATION



## Ionization or Capture

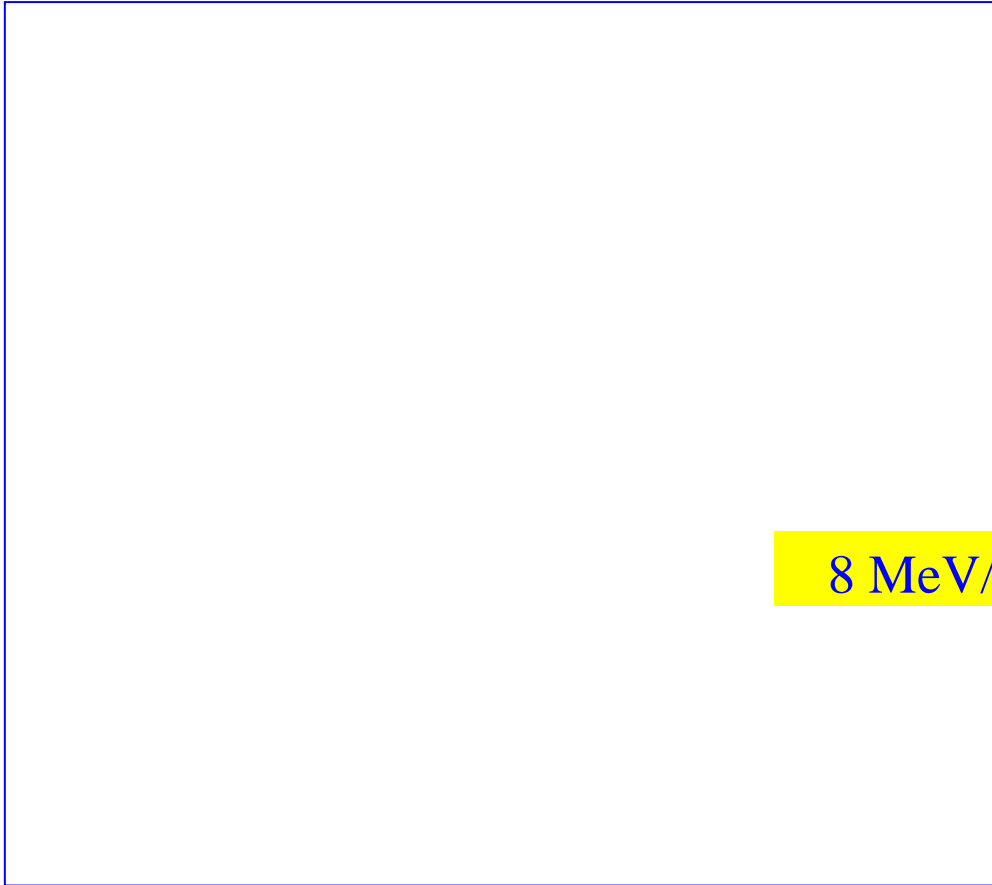


$$t_{\text{int.}} \cong 10^{-17} \text{ s}, t_{\text{diss.}} \cong 10^{-14} \text{ s}, t_{\text{rot.}} \cong 10^{-12} \text{ s}$$

## Orientation of the Molecule

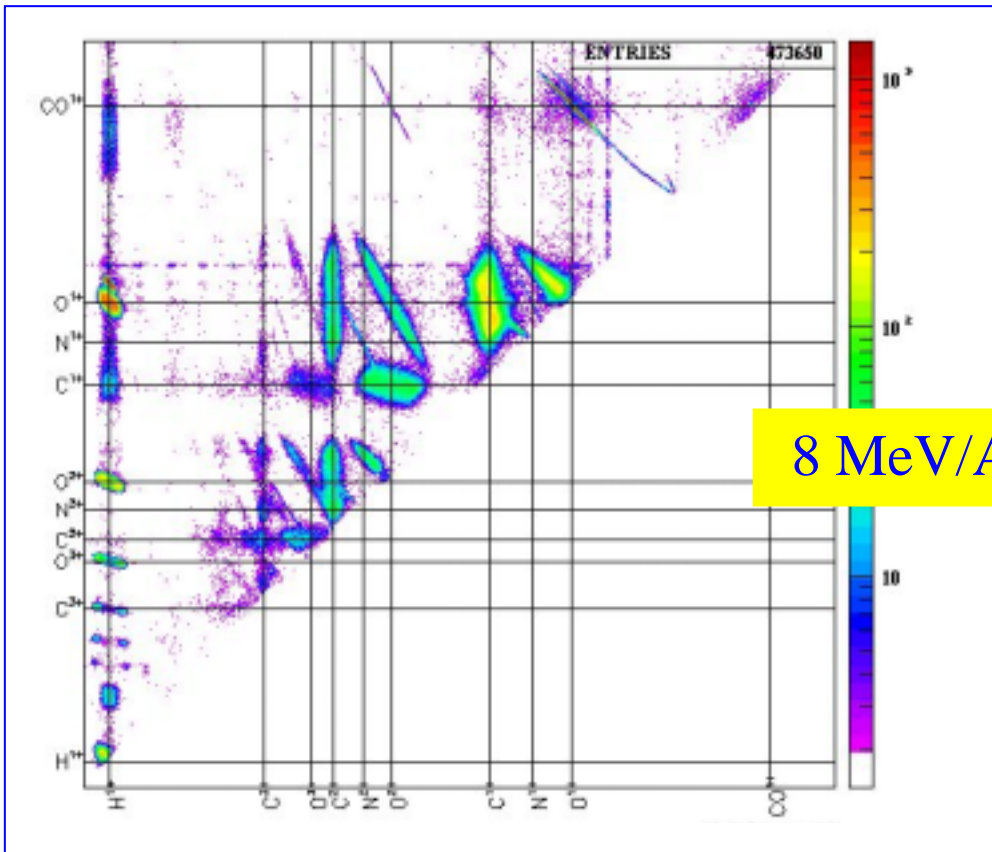
# FRAGMENT CORRELATION MAPS

TOF of 2<sup>nd</sup> fragment



8 MeV/A Ni<sup>24+</sup> + CO

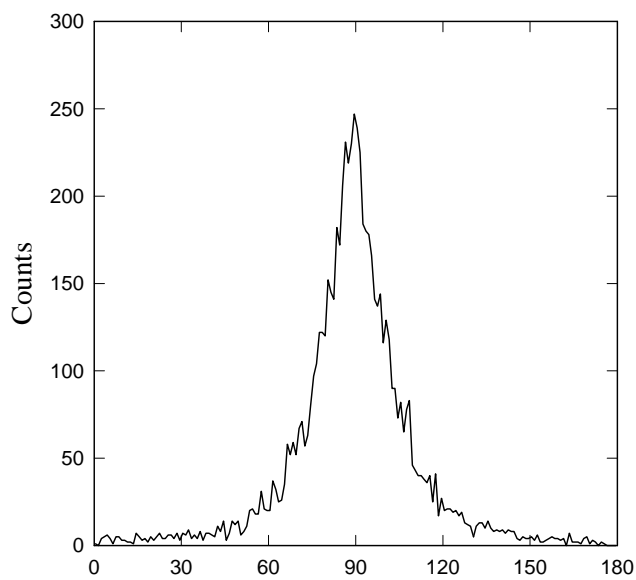
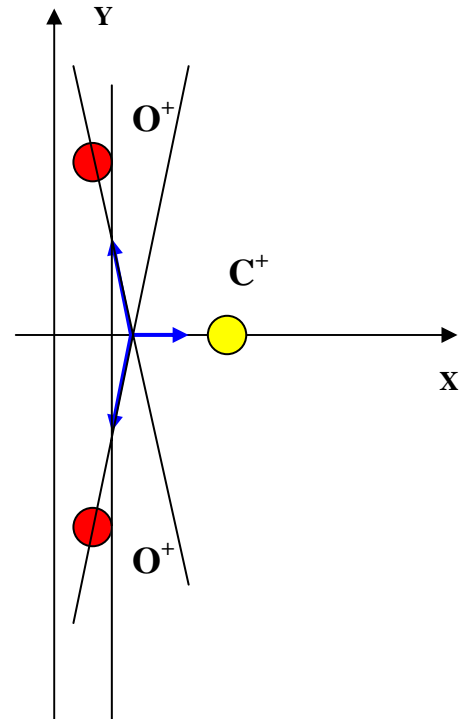
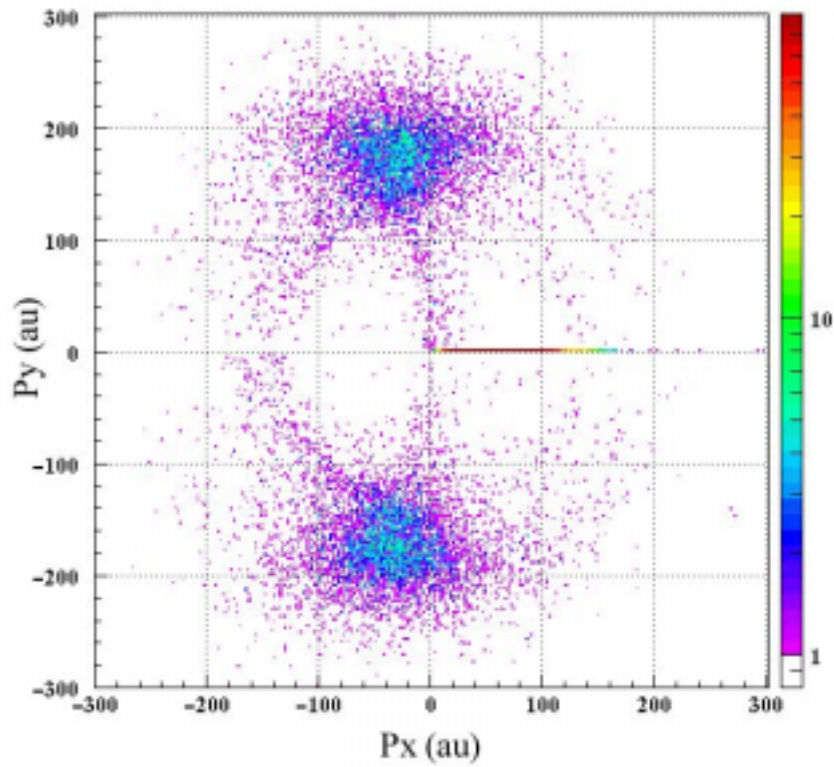
TOF of 2<sup>nd</sup> fragment



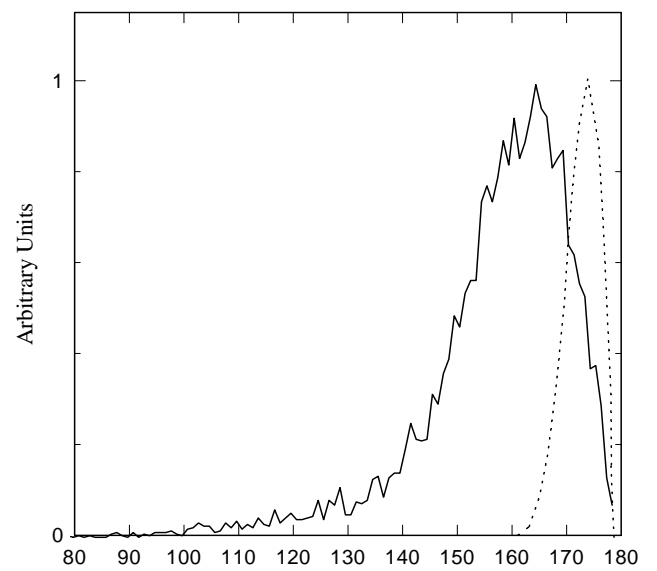
8 MeV/A Ni<sup>24+</sup> + CO<sub>2</sub>

TOF of 1st fragment

# THE $(\text{CO}_2)^{3+} \rightarrow \text{C}^+ + \text{O}^+ + \text{O}^+$ CHANNEL

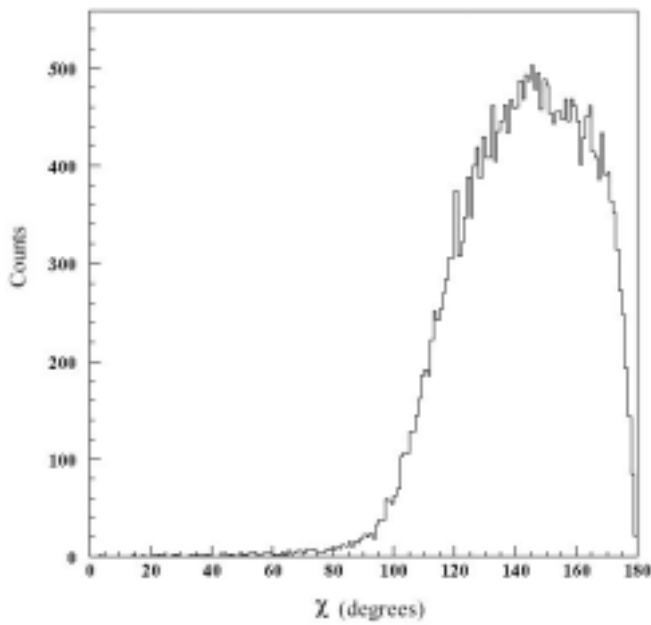
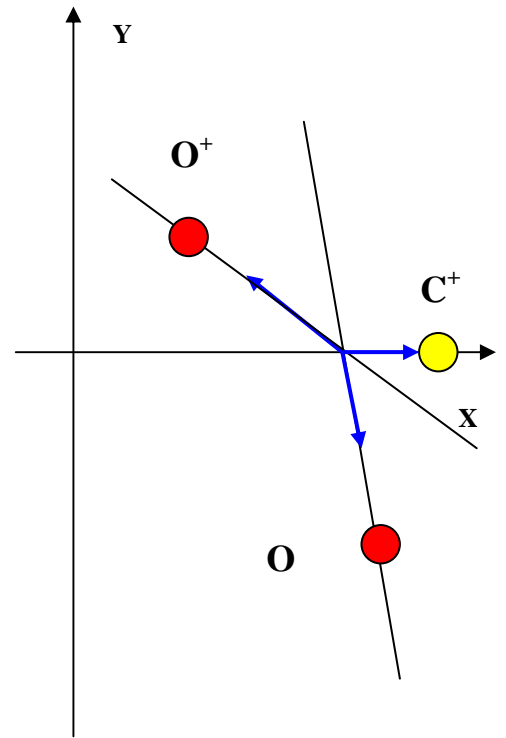
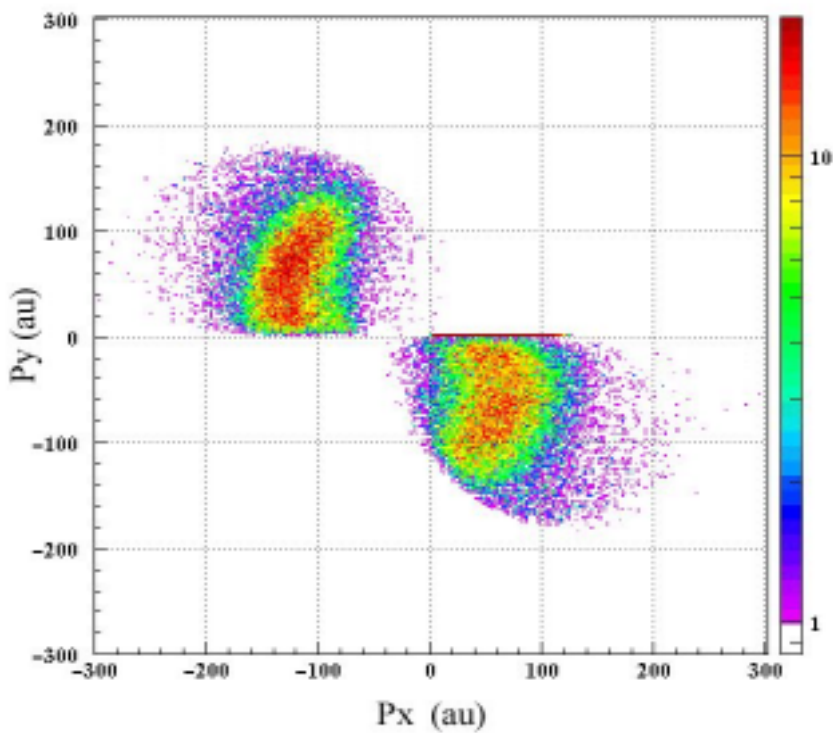


C<sup>+</sup>, O<sup>+</sup>-O<sup>+</sup> velocities angle (deg)

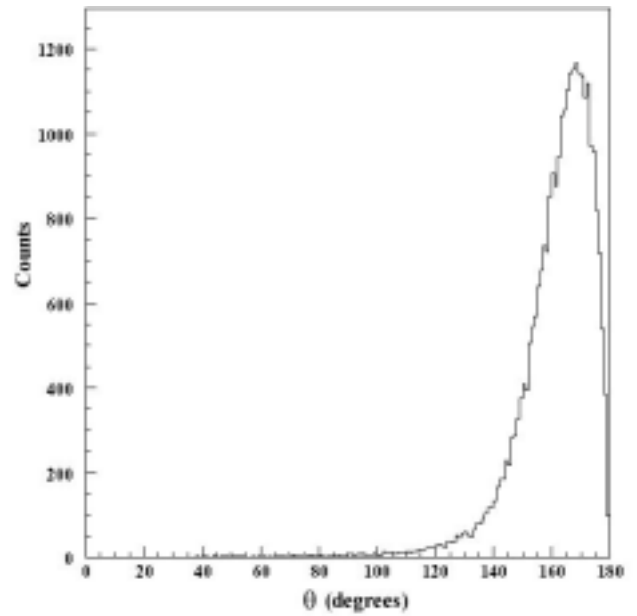


O<sup>+</sup>, O<sup>+</sup> velocities angle (deg)

# THE $(\text{CO}_2)^{2+} \rightarrow \text{C}^+ + \text{O}^+ + \text{O}$ CHANNEL

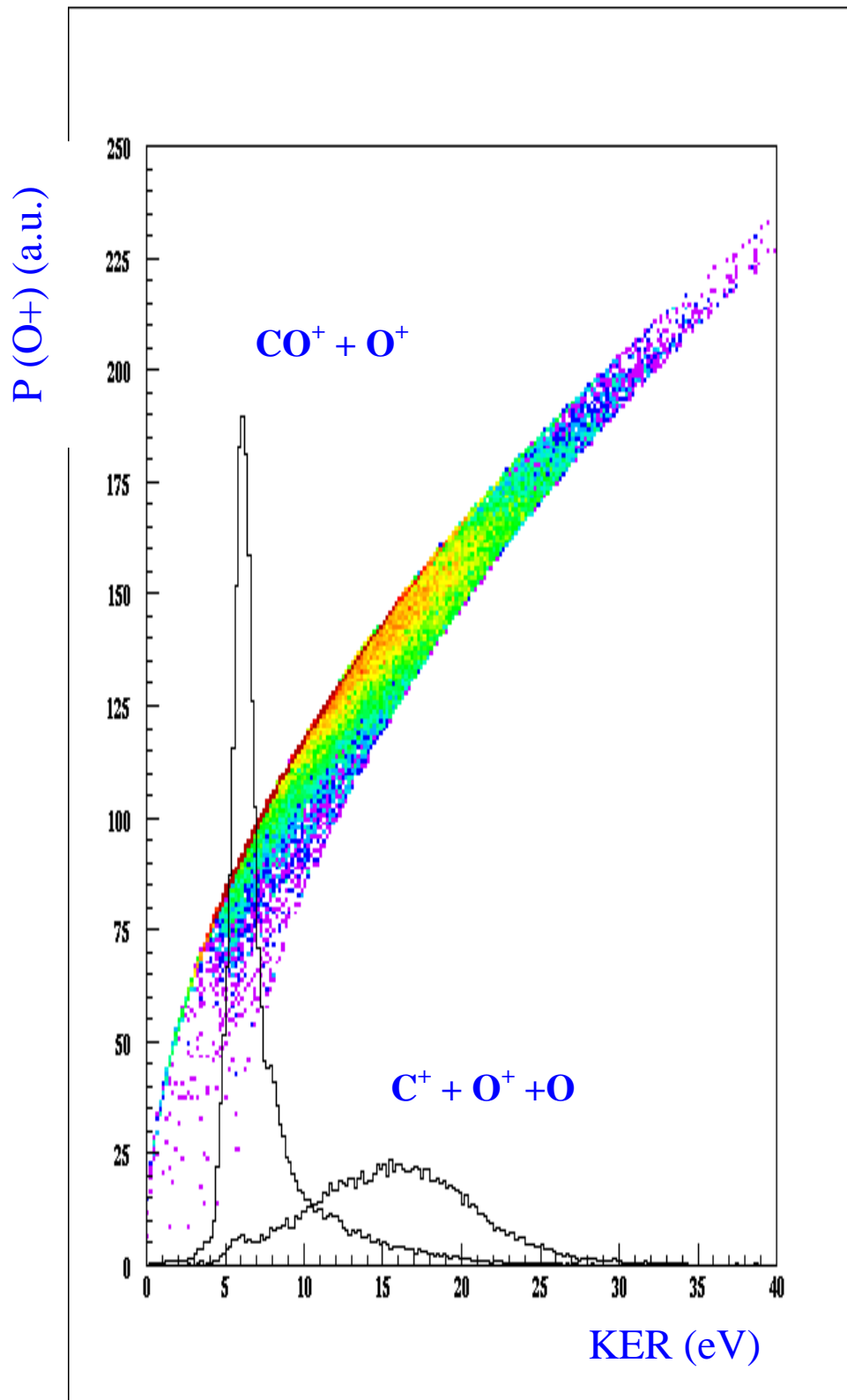


$\text{C}^+$ ,  $\text{O}^+$ - $\text{O}$  velocities angle (deg)



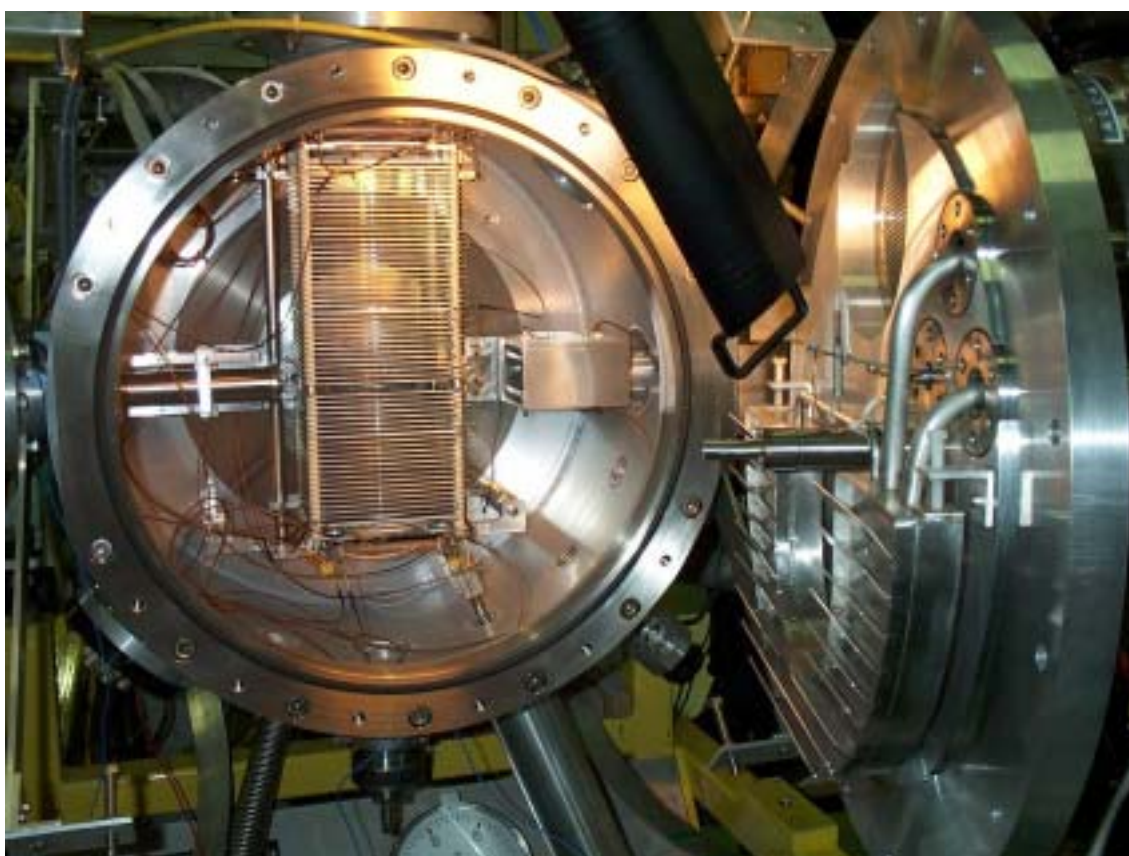
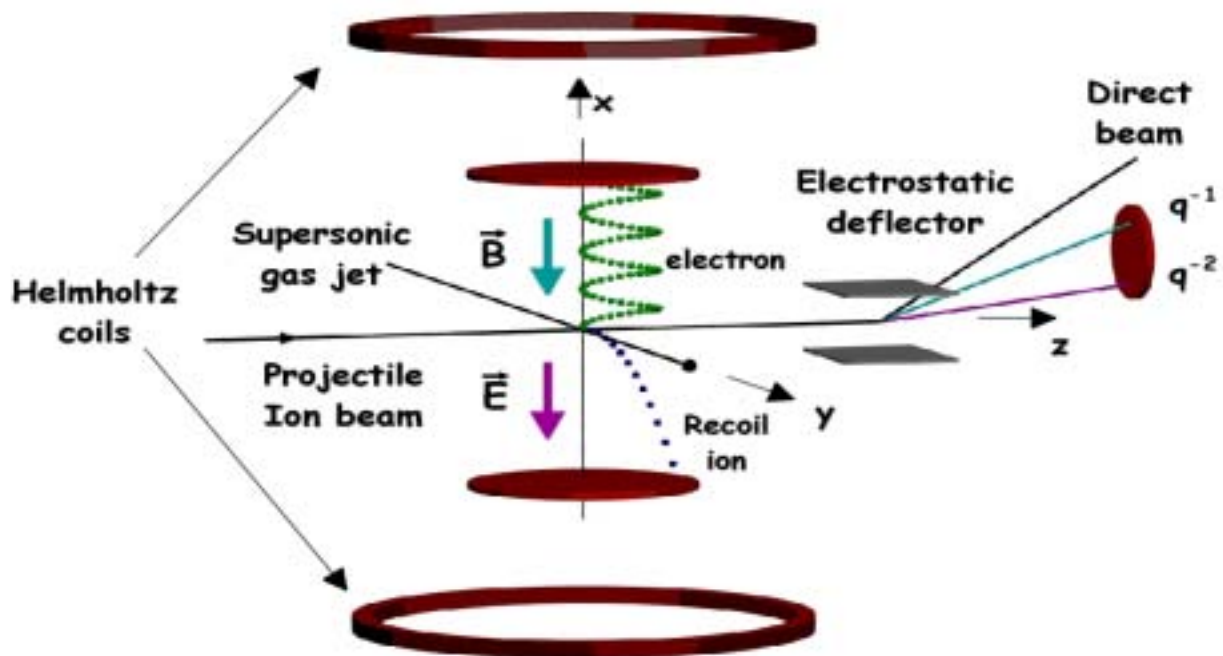
$\text{O}^+$ ,  $\text{O}$  velocities angle (deg)

# CO<sub>2</sub><sup>2+</sup> FRAGMENTATION



# COINCIDENT ELECTRON AND RIM SPECTROSCOPY REACTION MICROSCOPE

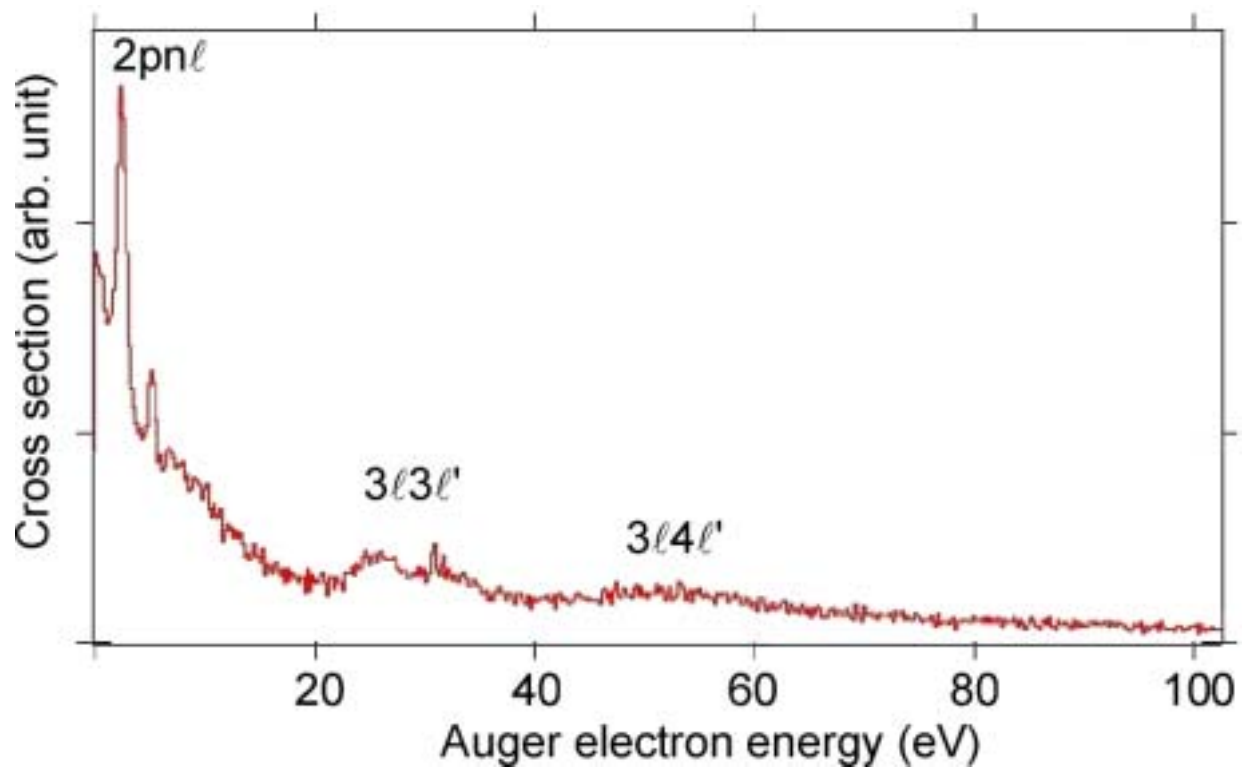
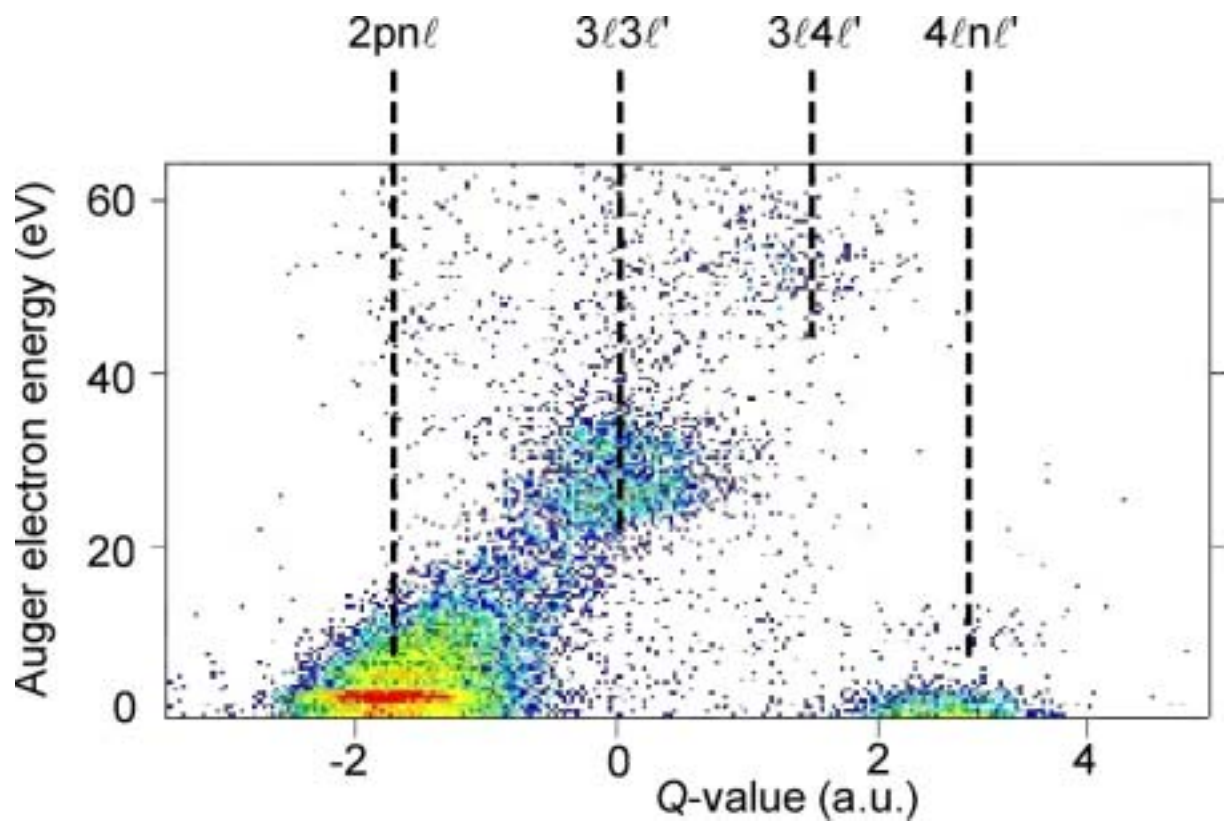
Rea





# COINCIDENT RIM AND AUGER ELECTRON SPECTROSCOPY

FOR THE SYSTEM  $138 \text{ keV O}^{6+} + \text{He}$



# FIELD FREE DETECTION DEVICE FOR THE STUDY OF H<sub>2</sub> MOLECULE FRAGMENTATION

