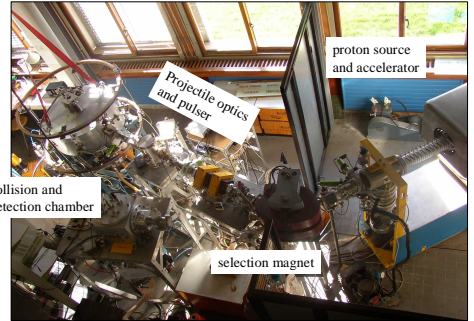
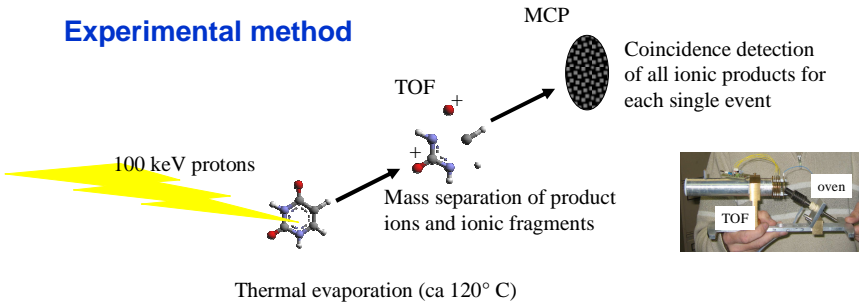


# Ionisation and fragmentation of radiosensibilizing molecules upon 100 keV protons collisions: evidence for keto → enol tautomerism for Uracil and halogenated derivatives.

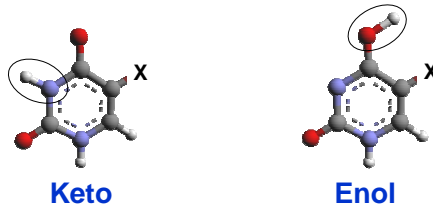
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## Experimental method



## Keto → Enol tautomerism

Initially, all molecules are in their keto form. The enol form is quasi-degenerate but is separated from the keto by a barrier of about 2 eV.



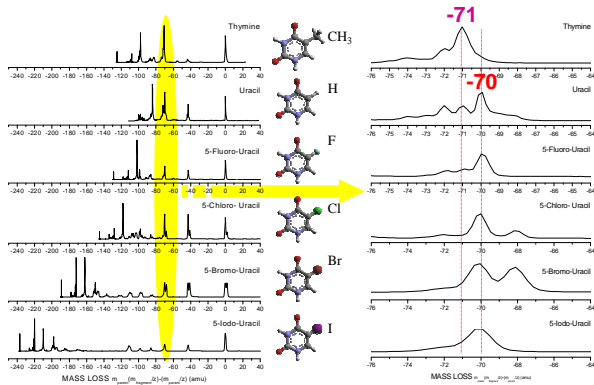
Molecules under investigation

Thymine: X = CH<sub>3</sub>

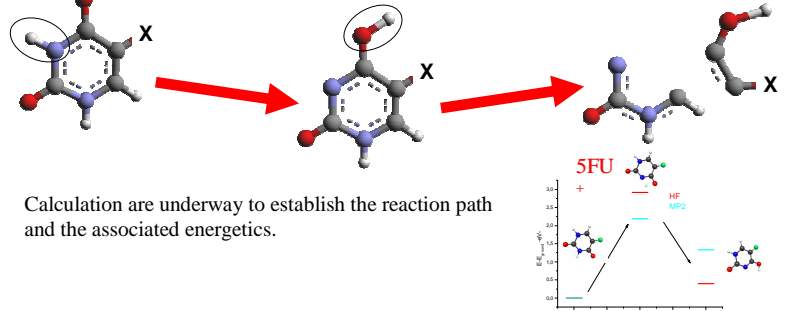
Uracil: X = H

5-X-Uracil: X = F, Cl, Br, I

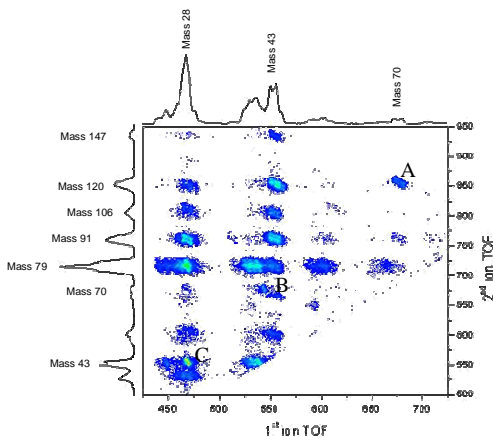
## Single ionisation



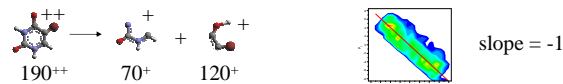
The only way to loose a fragment of mass 70 is to first form the enol tautomer then fragment!



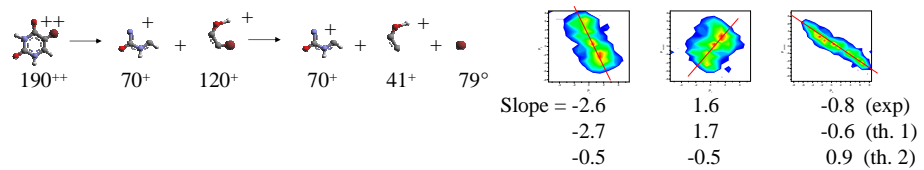
## Double ionisation : the example of 5 – Bromo - Uracil



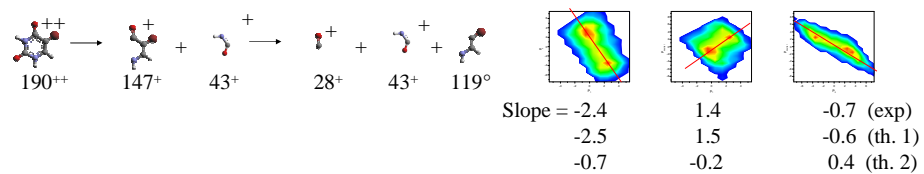
Channel A : two body dissociation with charge separation



Channel B : three body sequential dissociation with initial charge separation



Channel C : three body sequential dissociation with initial charge separation



3 body sequential dissociation: 2 possible sequences

1-  $ABC^{++} \rightarrow AC^+ + B^+ \rightarrow A^+ + B^+ + C^0$   
 $P_B = (-m_B/m_{AC}) P_A ; P_C = (m_C/m_{AC}) P_B = -(m_C/m_A) P_A$

2-  $ABC^{++} \rightarrow A^+ + BC^+ \rightarrow A^+ + B^+ + C^0$   
 $P_B = (-m_B/m_{BC}) P_A ; P_C = (m_C/m_B) P_B = -(m_C/m_{BC}) P_A$