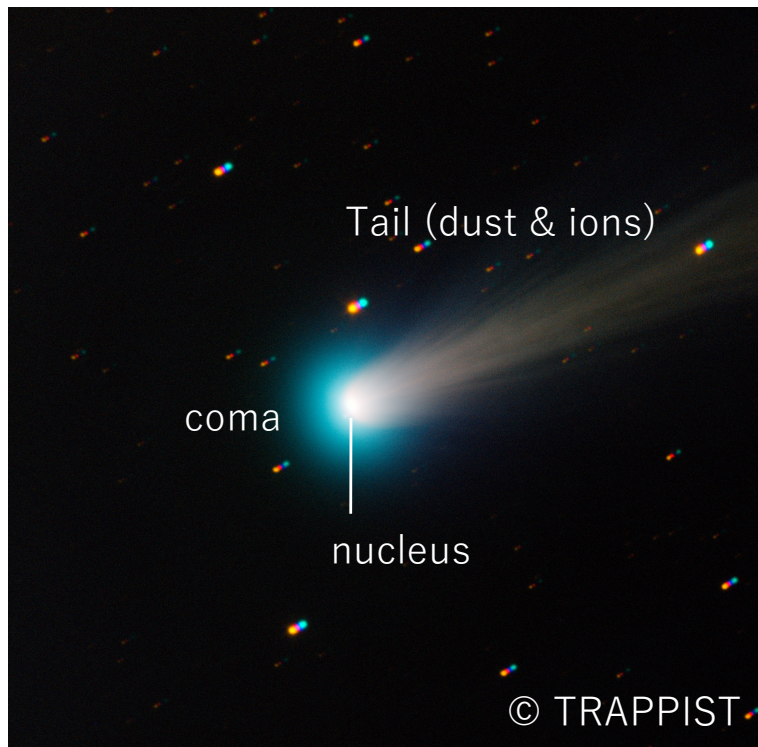


Ortho-to-para abundance ratios (OPRs) of NH_2 in comets: The meaning of OPRs of cometary volatiles

Yoshiharu Shinnaka (*NAOJ/JSPS Research Fellow*)

H. Kawakita¹, E. Jehini, A Decock², D. Hutsemékers², J. Manfroid²

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Comet :

- remnants of **icy planetesimals** formed in the solar nebula 4.6 Gyrs ago

Components:

- **icy** components : H_2O , CO , CO_2 , NH_3 , etc.
- **dust** components : Si, Mg, Fe, Na, etc.

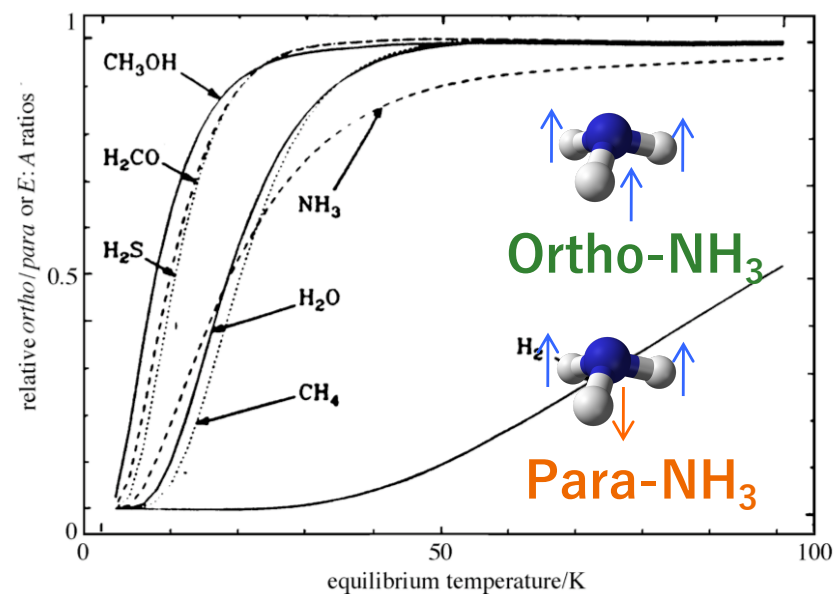
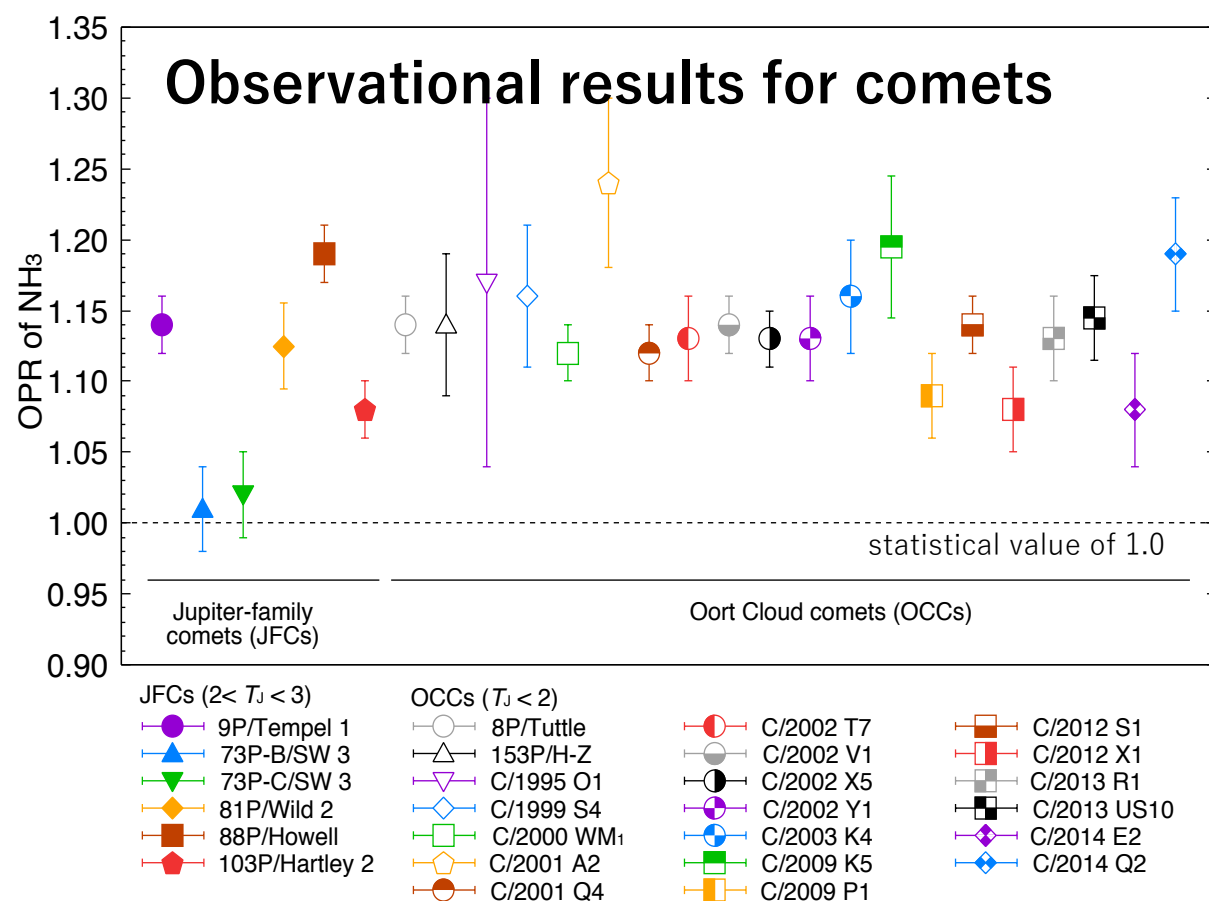
→ Cometary ices have kept **past information in the solar system**

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- A nuclear spin temperature is one of interpretations of OPR
- However, laboratory experiments demonstrated **fast ortho-para conversion** in **solid-phase water**

Nitrogen isotopic ratios of NH_2 and CN in comet C/2013 US10 (Catalina) by HDS/Subaru

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