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Metastable NAT in Ice-Clouds

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Polar Stratospheric Clouds and Cirrus Clouds contain, besides pure water ice, a rather large fraction of various hydrates. These are very important for the formation of the cloud, which is a yet not well understood process. We recently solved the structure of a metastable NAT phase (alpha-NAT), we believe to not only be present, but playing a major role in the formation of clouds.
On the basis of previous work on this phase by Grothe et al. [1], we enhanced the production of alpha-NAT to the point, where we could produce enough sample to do neutron diffraction. This enabled us to solve the structure.
Our quantum mechanical calculations, using this newly found structure, show a large affinity towards water-ice. With this in mind, we interlaced our results with the experiments of R. Iannarelli [2] to derive a new 3-step NAT-formation mechanism in ice-clouds, which could explain some of the observed kinetics better than the mechanism postulated in Zondlo et al. [3].

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