

DAMOP07-2007-000187

Abstract for an Invited Paper
for the DAMOP07 Meeting of
the American Physical Society

Spectroscopy of Hydrogen clusters : Non-rigidity of large parahydrogen clusters at low temperatures

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Interest in quantum clusters has increased over the last decade. Especially, clusters of molecular hydrogen have been attracted attention because of the possible superfluid phase of hydrogen clusters. Here, we have studied hydrogen clusters ($N=1 - 1000$) embedded in superfluid He nano-droplets at 0.4 K. Laser induced fluorescence of Mg-phtalocyanine simultaneously doped in droplets showed clear evidence of non-rigidity of parahydrogen clusters at 0.4 K. We will discuss the difference of para and ortho hydrogen clusters as well as Ar clusters in He nano-droplets. Spectra in hydrogen droplets ($N=10^5$, $T=4K$) will also be discussed.