THE OPTICAL SPECTRUM OF THIOZONE S_3 AND OTHER SULFUR RICH SYSTEMS

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The recent discovery and mapping of S_2 and SO_2 in the plume of Pele, one of the largest and most active volcanoes on Io, the innermost moon of Jupiter, suggests that other sulfur rich molecules may be abundant in this unusual planetary source.[a,b] Optical images of Io in the range 3900 Å - 5000 Å conclude as much: the observed flux intensity cannot be attributed to transitions of these molecules alone.[c] By means of 2-colour resonant-2-photon ionisation time of flight mass spectroscopy the optical spectrum of thiozone S_3 and other sulfur rich systems have now been detected. For thiozone a progression in the excited state bending mode is seen with a frequency of 350 cm^{-1} built onto the origin band at 433.82 nm. In this talk our results are compared to prior experimental matrix and low-resolution gas-phase work. The prospects for finding these atomic clusters in the atmosphere of Io will be discussed.

[a] J. R. Spencer, K. L. Jessup, M. A. McGrath, G. E. Ballester and R. Yelle, *Science*, **288**, 1208-1210, 2008
[b] A. Mollet, E. Lellouch, R. Moreno, M. A. Gurwell and C. Moore, *A&A*, **482**, 279-292, 2008
[c] P. Geissler, A. McEwen, C. Porco, D. Strobel, J. Saur, J. Ajello and R. West, *Icarus*, **172**, 127-140, 2004