

THE MILLIMETER WAVE SPECTRUM OF RARE IRON MONOXIDE ISOTOPOLOGUES: A MASS INDEPENDENT ANALYSIS

BJÖRN WABMUTH, ALEXANDER A. BREIER, GUIDO W FUCHS, THOMAS GIESEN, *Institute of Physics, University Kassel, Kassel, Germany.*

The role of iron containing molecular species in the interstellar medium is not fully understood. Iron monoxide was tentatively detected toward Sagittarius B2.^a In the laboratory the isotopologues ⁵⁶FeO and ⁵⁴FeO were rotationally measured in all five spin states in their $X^5\Delta_1$ ground state by Allen et al.^b We present laboratory measurements of rotational lines of the rare isotopologues ⁵⁷FeO, ⁵⁸FeO, and ⁵⁶Fe¹⁸O, including the hyperfine structure splitting due to the nuclear spin $I = 1/2$ of ⁵⁷Fe.

We performed a mass independent analysis^c with the new isotopic data and data from the literature. This enables us to predict molecular parameters and line transitions of the radioactive isotopologue ⁶⁰FeO. Kamiński *et al.* detected the radioactive molecule ²⁶AlF in the merger CK Vulpeculae by means of rotational spectroscopy^d. This is a powerful novel approach to use molecular transition to search for iron and its isotopes. Iron monoxide is a well suited candidate for a astronomical search for ⁶⁰Fe.

^aC.M. Walmsley *et al.*, *Astrophys. J.*, **566**:L109-L112, (2002).

^bM.D. Allen *et al.*, *Chem. Phys. Lett.*, **257**, 130-136, (1996).

^cA.A. Breier *et al.*, *J. Mol. Spectrosc.*, **355**, 46-58, (2019).

^dT. Kamiński *et al.*, *Nature Astronomy*, **2**, 778-783, (2018).