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

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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 ^{56}FeO and ^{54}FeO were rotationally measured in all five spin states in their $X^5\Delta_i$ ground state by Allen et al.[b] We present laboratory measurements of rotational lines of the rare isotopologues ^{57}FeO, ^{58}FeO, and ^{56}Fe^{18}O, including the hyperfine structure splitting due to the nuclear spin $I = 1/2$ of ^{57}Fe.[c]

We performed a mass independent analysis[d] with the new isotopic data and data from the literature. This enables us to predict molecular parameters and line transitions of the radioactive isotopologue ^{60}FeO. Kamiński *et al.* detected the radioactive molecule ^{26}AlF in the merger CK Vulpeculae by means of rotational spectroscopy [e]. 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 ^{60}Fe.

[a] C.M. Walmsley *et al.*, *Astrophys. J.*, **566**:L109-L112, (2002).
[b] M.D. Allen *et al.*, *Chem. Phys. Lett.*, **257**, 130-136, (1996).
[c] B. Waßmuth *et al.*, *Mol. Phys.*, **118**, 19-20, (2020).
[d] A.A. Breier *et al.*, *J. Mol. Spectrosc.*, **355**, 46-58, (2019).
[e] T. Kamiński *et al.*, *Nature Astronomy*, **2**, 778-783, (2018).