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WITHDRAWN - Identification of the $A^1\Pi$ and $a^3\Pi$ electronic states of magnesium monosulphide, MgS

Magnesium and sulphur are the 9th and 10th most abundant elements in our galaxy, and a compound in solid form (niningerite) has been found in meteors. Its gas-phase compounds are therefore candidates for detection in stellar atmospheres, as have been the magnesium-bearing compounds MgNC and MgCN. The simplest combination of these elements, MgS, is a gas-phase radical that until recently had been characterized only in its ground state $X^1\Sigma^+$ via microwave- and millimetre-wave spectroscopy, and through the $B^1\Sigma^+ - X^1\Sigma^+$ electronic transition near 434 nm. In some recent experiments, we have created MgS by producing gas-phase magnesium in a Broida oven, exciting the atoms with activated nitrogen, and reacting these with CS_2. This has permitted us to excite individual rotational levels of the $B^1\Sigma^+$ state with a cw laser beam and to observe the fluorescence from them. We will report on the analysis of this fluorescence, which has allowed us to locate the two lowest excited states of MgS, $A^1\Pi$ and $a^3\Pi$, and to determine their rotational structure for comparison with calculations.

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