THE ROTATIONAL SPECTRUM OF LUTETIUM MONOXIDE, LuO ($X^2\Sigma^+$), PREPARED USING LASER ABLATION, MEASURED WITH A CAVITY PULSED JET FOURIER TRANSFORM SPECTROMETER[a]

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The N = 1 - 0 rotational transition of $^{175}Lu^{16}O$ ($X^2\Sigma^+$) has been measured for the ground and several excited vibrational states. The molecules were prepared by laser ablation of Lu metal in the presence of O_2, and stabilized in supersonic jets of Ar. The spectra were observed with a cavity pulsed jet Fourier transform microwave spectrometer. Detailed assignments have been made in terms of case $b_{\beta s}$ coupling, using the Zeeman patterns of the lines in the Earth's magnetic field. The equilibriuminternuclear distance r_e, the electron spin-rotation constant γ and several ^{175}Lu hyperfine constants have been precisely evaluated, and will be compared with earlier values and the results of quantum chemical calculations. The astrophysical relevance of the results will also be discussed.

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