Empowering Space Science Research in Jordan through Spectroscopic Data Generation and Global Collaboration

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Significant progress in space sciences and molecular spectroscopy is currently underway in Jordan, driven by the Astronomy, Astrophysics, and Space Technology Research Group (AASTG) at the University of Jordan and the AstroJo Institute. Over the past 2.5 years, a coordinated national effort involving 30 Jordanian researchers has focused on producing high-precision empirical rovibrational energy levels for a range of astrophysically and atmospherically relevant molecules and their isotopologues using the MARVEL (Measured Active Rotational-Vibrational Energy Levels) protocol.

This initiative marks a major capacity-building milestone for the region, representing one of the largest space science training programs in the Arab world. The project has been carried out in close collaboration with Prof. Jonathan Tennyson (University College London) and Prof. Attila G. Császár (Eötvös Loránd University), both of whom have played key advisory roles in the scientific direction and quality assurance of the MARVEL analyses.

The resulting datasets are of direct relevance to high-resolution spectroscopic applications such as exoplanet atmosphere modelling, astrophysical observations, and remote sensing. They contribute to global efforts in refining molecular databases like ExoMol, HITRAN, and CDMS. Beyond scientific outcomes, this work has established a highly trained local research workforce capable of contributing rapidly and effectively to international projects.

We now seek to expand this momentum through new international collaborations, offering a large, trained team ready to accelerate molecular spectroscopy research and data production on short timescales. This Jordanian initiative demonstrates how regional investment in space science infrastructure and training can have global impact.