Supplementary Materials: Perspectives on Neutron Scattering in Lanthanide-Based Single-Molecule Magnets and a Case Study of the $Tb_2(\mu\text{-}N_2)$ System

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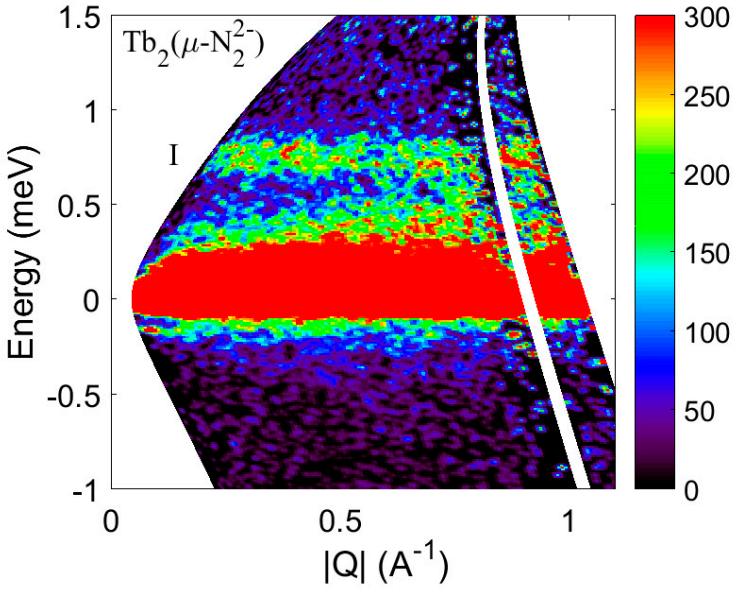

Figure S1. A low-energy *S(Q,ω)* scan on the parent compound **1**. The 0.75 meV excitation is clearly visible at lower momentum transfers $Q < 0.5$ Å^{-1}, which confirms its magnetic origin.

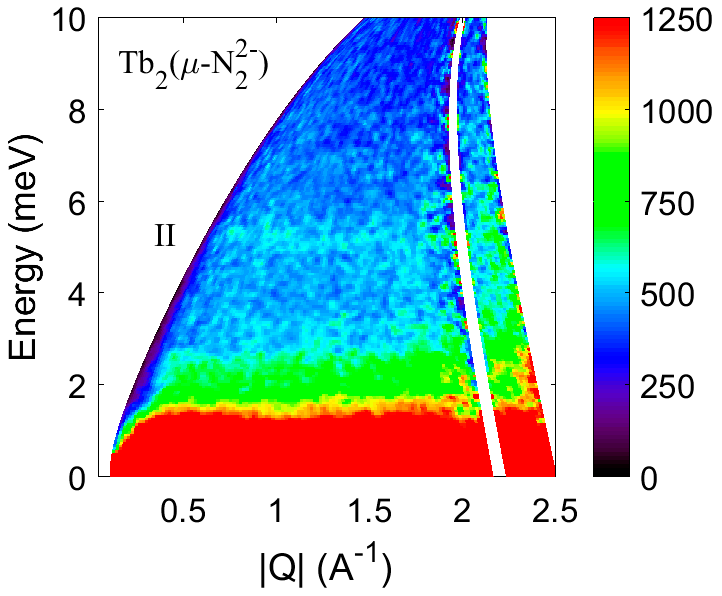

Figure S2. An intermediate energy *S(Q,ω)* scan on the parent compound **1**. The 5 meV excitation is clearly present at lower momentum transfers $Q < 1$ Å^{-1}, which confirms its magnetic origin.

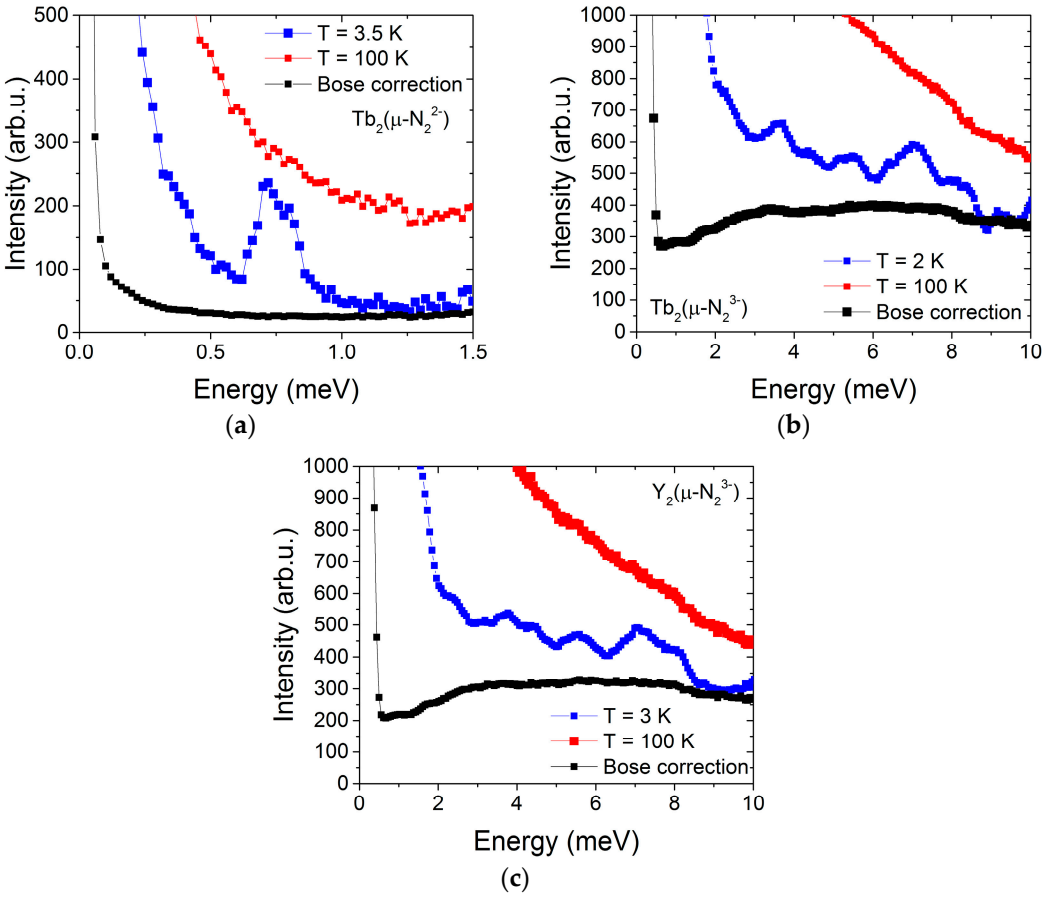

Figure S3. INS spectra of compounds **1** (**a**); **2** (**b**) and **3** (**c**) at low temperatures (blue symbols) and high temperatures (red symbols). The Bose-corrected high-temperature data are shown by black symbols, but obviously do not estimate the low-temperature lattice contributions in these compounds accurately.