

Tensor polarization optimization and measurement for solid spin 1 targets

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A discussion of dynamic orientation using optimized radio-frequency (RF) irradiation produced perpendicular to the holding field is presented for the spin-1 system required for tensor polarized fixed target experiments. The rate equations are solved numerically to study a semi-saturated steady-state resulting from the two sources of irradiation, microwave from the DNP process and the additional RF used to manipulate the tensor polarization. The steady-state condition and continuous wave NMR lineshape are found that optimize the spin-1 alignment in the polycrystalline materials used as solid polarized targets in charged beam nuclear and particle physics experiments. Measurement of the tensor polarization is achieved using the constraints from the rate equations for various RF manipulated lineshapes.