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## Energy-momentum tensor distribution for transversely polarized nucleons

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We study the spatial distributions of the energy-momentum tensor (EMT) for transversely polarized nucleons in the elastic frame (EF), a general reference frame that bridges the Breit frame (rest frame) and the infinite momentum frame (IMF). As the longitudinal momentum,  $P_z$ , increases, the spin-dependent contributions are induced in the EF energy and EF longitudinal normal force distributions, derived from the matrix elements  $\hat{T}^{00}$  and  $\hat{T}^{33}$ , respectively. In contrast, in the EF longitudinal momentum distribution, associated with the matrix element  $\hat{T}^{03}$ , the spin-independent contributions are induced as  $P_z$  increases. These induced contributions lead to distortions in each distribution. In the IMF, the spin-dependent contributions vanish, while the spin-independent ones remain, resulting in a perfect monopole structure in the EF energy, EF longitudinal momentum, and EF longitudinal normal force distributions for the transversely polarized nucleon.

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