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Longitudinal Response Function of ^{3}H from Chiral Potentials[1]
MICHAEL DESROCHERS, SONIA BACCA, TRIUMF, 4004 Wesbrook Mall Vancouver, BC V6T 2A3 — In the electron scattering off a nucleus, the cross section is proportional to the longitudinal response function

$$R_L(\omega, \mathbf{q}) = \sum_{\mathbf{f}}^{f} |\langle \mathbf{\Psi_f} | \rho(\mathbf{q}) | \mathbf{\Psi_0} \rangle|^2 \, \delta \left(\mathbf{E_f} - \mathbf{E_0} - \omega \right), \tag{1}$$

where $\rho(\mathbf{q})$ is the current operator. We aim at calculating it for the ^{3}H nucleus using Chiral Effective Field Theory (EFT) potentials. Electron scattering observables are sensitive to three-nucleon forces [1], and thus, it is relevant to test EFT on reactions in the continuum. We use the Lorentz Integral Transform (LIT) to reduce the continuum problem to the solution of a bound state like equation [2] which is solved by expanding wave functions in terms of hyperspherical harmonics [3]. The response is obtained by a numerical inversion of the (LIT). Preliminary results are presented for low energies at q = 174 MeV/c, along with a comparison with experimental data and previous calculations [4].
[1] Bacca *et al.* Phys. Rev. Lett. 102, 162501 (2009)
[2] Efros *et al.* Phys. Lett. B, 338 130 (1994)
[3] Barnea *et al.* Phys. Rev. C 61, 054001 (2000)
[4] Efros *et al.* Phys. Rev. C 69, 044001 (2004)

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Sonia Bacca
TRIUMF, 4004 Wesbrook Mall Vancouver, BC V6T 2A3

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