

TABLE III: Summary of fit results for unpolarized neutron two-point functions using the time window: $5 \leq t/a_t \leq 28$. All quoted values are averages over the bootstrap ensemble, and are given in dimensionless lattice units. The quantity $\mathcal{A}_E^{\text{latt}}$ is the pseudo-polarizability defined in Eq. (B5). For the fits, χ^2/d is the minimized chi-squared per degree of freedom, and $1 - P$ is the chi-squared integrated from the minimum value to infinity. The first half of the table summarizes the time-correlated fits to the effective energies in each field using Eq. (B3), while the second half summarizes the field-correlated fits using Eq. (B4). The two differing fits to the latter are denoted by I and II, and are described in the text. The second uncertainty on the pseudo-polarizability is an estimate of the systematic due to the choice of fit window as explained in the text.

N	n	$a_t E_{\text{eff}}(n)$	χ^2/d	$1 - P$
	0	0.2041(23)	0.50	0.97
	1	0.2058(21)	0.67	0.88
	2	0.2082(23)	0.97	0.50
	3	0.2130(21)	0.70	0.85
	4	0.2204(21)	0.70	0.85

N	$a_t M$	$\mathcal{A}_E^{\text{latt}}$	χ^2/d	$1 - P$
I	0.205(2)	17(11)(1)	0.53	0.75
II	0.204(2)	20(25)(3)	0.52	0.72

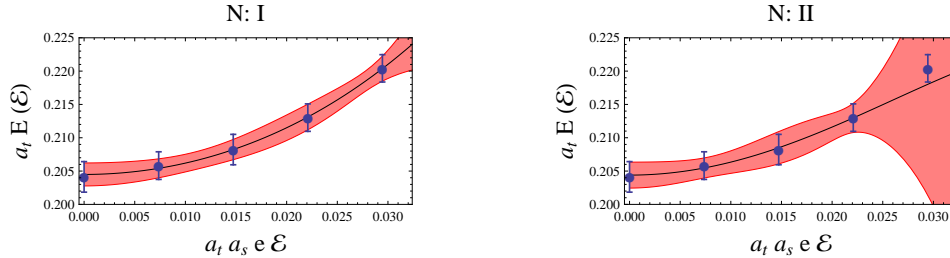


FIG. 7: Electric field strength dependence of the neutron effective energy. The two different field-correlated fits (I and II) are described in the text, and the bands show the total uncertainty.

the fits are collected in Table III. The coefficient of the term quadratic in the field strength is not physically the electric polarizability because it includes Born-level contributions from the magnetic moment. For this reason, we call this coefficient the pseudo-polarizability. In our choice of lattice units, the pseudo-polarizability is given by

$$\mathcal{A}_E^{\text{latt}} = \alpha_E^{\text{latt}} - \frac{a_t M}{2\xi^2} (\mu^{\text{latt}})^2, \quad (\text{B5})$$

with ξ as the anisotropy factor. The systematic due to the fit window is estimated by performing uncorrelated fits on the adjacent fit windows obtained by varying the start and end times by one unit.

The extracted value for the pseudo-polarizability is roughly half the size of the electric