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Search for a continuum limit of the PMS phase

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Previous studies of a simple four-fermion model with staggered fermions in 3d have shown the existence of an exotic quantum critical point, where one may be able to define a continuum limit of the Paramagnetic Strong Phase (or the PMS phase). We believe the existence of the critical point suggests a new mechanism for generating fermion masses. In this work we begin the search for this quantum critical point in 4d by extending the 3d model to 4d.

Unlike in 3d, now we do find evidence for an intermediate spontaneously broken phase (FM phase) and are able compute the phase boundaries accurately. In terms of the bare coupling, the width of the intermediate region appears to be quite small.

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