

## Spin-3/2 Pentaquark Resonance Signature

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Abstract: We search for the standard lattice resonance signature of attraction between the resonance constituents which leads to a bound state at moderate quark masses near the physical regime. We study a variety of spin- $\frac{1}{2}$  interpolators and for the first time, interpolators providing access to spin- $\frac{3}{2}$  pentaquark states. In looking for evidence of binding, a precise determination of the mass splitting between the pentaquark state and its lowest-lying decay channel is performed by constructing the effective mass splitting from the various two-point correlation functions. While the binding of the pentaquark state is not a requirement, the observation of such binding would provide compelling evidence for the existence of the  $\Theta^+$  pentaquark resonance. Evidence of binding is observed in the isoscalar spin- $\frac{3}{2}$  positive parity channel, making it an interesting state for further research.