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Meson-Glueball spectrum and matrix elements from $Sp(4)$ lattice gauge theories with matter fields in multiple representations

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The asymptotic states of QCD are observed to be colour singlets. Among the possible colour singlets one can build there is the experimentally unconfirmed glueball, a bound state of gluons. Lattice simulations of $SU(3)$ Yang-Mills are able to probe several glueball channels and predict that the lightest states is heavy. With dynamical fermions the glueball becomes unstable and can mix with other states in the theory, making the phenomenological picture less clear. I will present preliminary results of the flavour-singlet spectrum, including glueballs of a $Sp(4)$ lattice gauge theory with dynamical fermions. We find a glueball state that is stable in the present of dynamical fermions and near threshold, providing a good starting point to study glueball decay.

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