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Search for New Physics with Gluonic Penguin B Decays GIOR-DANO CERIZZA, MAHALAXMI KRISHNAMURTHY, University of Tennessee, Knoxville, BABAR COLLABORATION — Charmless B -meson decays such as $B \rightarrow \eta' K$ and $B \rightarrow \phi K$ are dominated by transitions into a s -quark and a gluon via internal W -quark loops. In these loops new particles and forces as e.g. predicted by supersymmetric models can contribute virtually. This provides an opportunity to detect such New Physics as deviation of CP asymmetries from Standard Model expectations and with negligible or small hadronic uncertainties. The BaBar collaboration has now accumulated more than 350 million $\bar{B}B$ events at the $\Upsilon(4S)$ resonance. To overcome the rareness of these charmless B decay final states we have reconstructed many sub-decay modes and additional similar penguin decays. We present the new CP measurements in the $\eta' K$ and $\phi(K^+K^-)K$ final states. With time-dependent B -decay Dalitz plot analyses we expand the spectrum of penguin decays.

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