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Fundamental Physics Implications on Higher-Curvature Theories from the Binary Black Hole Signals in the LIGO-Virgo Catalog GWTC-1[1] SCOTT PERKINS, University of Illinois at Urbana-Champaign, REMYA NAIR, Montana State University , HECTOR SILVA, NICOLAS YUNES, University of Illinois at Urbana-Champaign — Gravitational-wave astronomy offers not only new vistas into the realm of astrophysics, but also opens an avenue for probing, for the first time, general relativity in its strong-field, nonlinear and dynamical regime, where the theory's predictions manifest themselves in their full glory. In this talk, I will present a study of whether the gravitational-wave events detected so far by the LIGO-Virgo scientific collaborations can be used to probe high-curvature corrections to general relativity. I will focus on two example theories: Einstein-dilaton-Gauss-Bonnet and dynamical Chern-Simons gravity. To illustrate our methodology, I will first outline how our bounds can be estimated from analytic calculations, then through another estimate using the Fisher matrix, and finally through the full posteriors released by LIGO/Virgo, which were obtained through Markov Chain Monte Carlo sampling. To finish, I will discuss the final constraints produced by the two events GW151226 and GW170608 on Einstein-dilaton-Gauss-Bonnet and dynamical Chern-Simons gravity.

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