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Improving LIGO Data Quality By Detecting Artifacts Arising from Bilinear and Nonlinear Noise Couplings BERNARD HALL, NAIRWITA MAZUMDER, LIGO Scientific Collaboration/WSU Relativity Group — In this work, we describe tools developed for detecting artifacts in the gravitational wave (GW) channel of the Laser Interferometer Gravitational-wave Detector (LIGO) arising from bilinear and nonlinear noise couplings. Such artifacts reduce the sensitivity of searches for transient GW signals, e.g., from compact binary coalescences (CBCs), by increasing their false-alarm rates. Once detected, the noise sources must be identified, with the objective of either removing them or handling them in a way that mitigates their adverse effect on data quality. We recently updated these tools for Advanced LIGO (aLIGO) data analysis and successfully applied it to the last engineering run “ER6” data. We describe here some of the higher order noise couplings found in that data and steps underway to understand their sources.

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