Report on LIGO Science Run S4\textsuperscript{1} FREDERICK RAAB, LIGO Hanford Observatory, LIGO LABORATORY TEAM, LIGO SCIENTIFIC COLLABORATION — Following a year of detector commissioning advances, the Laser Interferometer Gravitational-Wave Observatory (LIGO) conducted a search for gravitational wave sources from Feb 22 to Mar 23, 2005. The run included LIGO’s 4-km and 2-km interferometers at Hanford, Washington and the 4-km interferometer at Livingston, Louisiana. The GEO600 interferometer in Hannover, Germany and the Allegro and Auriga resonant bar detectors in Baton Rouge, Louisiana and Padova, Italy also took data overlapping this run. Improvements to wave-front sensing and alignment control of mirrors, implementation of thermal lensing controls and implementation of active vibration isolation allowed operation of the LIGO interferometers with duty cycles exceeding 74% and with strain-equivalent noise of order $10^{-22} \text{Hz}^{-1/2}$.

\textsuperscript{1}Work reported on behalf of the LIGO Laboratory and the LIGO Scientific Collaboration. LIGO Laboratory is supported by National Science Foundation Cooperative Agreement PHY-0107417.

Frederick Raab
LIGO Hanford Observatory

Date submitted: 12 Apr 2005

Electronic form version 1.4