Why LIGO can’t detect HFGWs

The advertised Laser Interferometer Gravitational Observatory (LIGO) sensitivity (see, for example, "Gravitational Waves and the Effort to Detect them," in *American Scientist*, Volume 42, July-August, 2004, p. 356) is 40Hz to 2000Hz. Here's the problem with higher frequencies: One has to "observe" the interference pattern between the LIGO legs caused by the passage of a gravitational wave. From the referenced article: "At higher frequencies, the quantum nature of the laser beam (made of discrete photons, albeit a large number of them) limits the precision of the measurement. Increased laser power would reduce the problem of quantum noise, but ultimately the LIGO (and other) interferometers (such as the Advanced LIGO and the proposed Laser Interferometer Space Antenna or LISA) are not suited to measuring gravitational waves that stretch or shrink the arms much more rapidly than the time a photon typically remains in the optical cavity, which is roughly a millisecond for these interferometers (thus a one kilocycle frequency)." That's why one must turn to the Birmingham University, England; the INFN Genoa, Italy; the Chongqing University, China, or other specifically High-Frequency Gravitational Wave (HFGW) detectors. By the way, HFGWs are defined by Hawking and Israel as having frequencies of 100 kHz to 100 MHz. Very high-frequency gravitational waves (VHFGWs) have frequencies of 100 MHz to 100 GHz and, presumably, ultra high-frequency gravitational waves (UHFGWs) have frequencies above 100 GHz (theoretically generated by lasers as discussed by Baker, Li, and Li, 2005). The generic term HFGWs describes all three of these bands. (Hawking, S.W. and Israel, W. *General Relativity: An Einstein Centenary Survey*, Cambridge University Press, Cambridge, 1979, p.98.)