INTEGRAL Observations of GW170104 - DTU Orbit (30/12/2018)

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We used data from the International Gamma-Ray Astrophysics Laboratory (INTEGRAL) to set upper limits on the γ-ray and hard X-ray prompt emission associated with the gravitational-wave event GW170104, discovered by the Laser Interferometer Gravitational-wave Observatory (LIGO)/Virgo collaboration. The unique omnidirectional viewing capability of the instruments on board INTEGRAL allowed us to examine the full 90% confidence level localization region of the LIGO trigger. Depending on the particular spectral model assumed and the specific position within this region, the upper limits inferred from the INTEGRAL observations range from $F_γ = 1.9 \times 10^{-7}$ erg cm$^{-2}$ to $F_γ = 10^{-6}$ erg cm$^{-2}$ (75 keV–2 MeV energy range). This translates into a ratio between the prompt energy released in γ-rays along the direction to the observer and the gravitational-wave energy of $E_γ / E_{GW} < 2.6 \times 10^{-5}$. Using the INTEGRAL results, we cannot confirm the γ-ray proposed counterpart to GW170104 by the Astro—Rivelatore Gamma a Immagini Leggero (AGILE) team with the mini-Calorimeter (MCAL) instrument. The reported flux of the AGILE/MCAL event, $E_2$, is not compatible with the INTEGRAL upper limits within most of the 90% LIGO localization region. There is only a relatively limited portion of the sky where the sensitivity of the INTEGRAL instruments was not optimal and the lowest-allowed fluence estimated for $E_2$ would still be compatible with the INTEGRAL results. This region was also observed independently by Fermi/Gamma-ray Burst Monitor and AstroSAT, from which, as far as we are aware, there are no reports of any significant detection of a prompt high-energy event.