At much smaller scales, close to the compact object, an inflated accretion flow with a corona-like structure could also be a potential gamma-ray emission zone. Romero, Vieyro, & Vila (2010), have explored this scenario in the context of coronae around galactic black holes, such as Cyg X-1 (see also Vieyro & Romero 2011).

4. CHALLENGES

The discovery of HE and VHE gamma-ray emitting X-ray binaries has triggered an intense effort to better understand the particle acceleration, absorption, and emission mechanisms in compact binary systems. Some of the physical processes involved, in particular, those related with the presence of the jets, share a common problematic with Young Stellar Objects and AGNs. But the context of gamma-ray binaries which provide variable conditions along eccentric orbits and the jet/wind interaction possibility is truly unique at the same time that the complexity brought by a massive star makes HMMQ phenomenology difficult to interpret. Analogies between sources are then to be treated with care, and deeper comprehensive studies are desired from both theoretical and multiwavelength observational grounds. The new instrumentation in gamma-rays is crucial to carry out refined studies and to find more sources, allowing to speak in statistical terms of a real population.

Refined models/simulations including variability, acceleration prescriptions, absorption and secondary emission may help constrain the acceleration and radiation mechanisms, and disentangle the location and contributions from different emitting regions.

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