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The Southern Wide-field Gamma-ray Observatory reach for Primordial Black Hole evaporation

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The Southern Wide-field Gamma-ray Observatory (SWGO) is a proposed ground-based gamma-ray detector that will be located in the Southern Hemisphere and is currently in its design phase. In this contribution, we will outline the prospects for Galactic science with this Observatory. Particular focus will be given to the detectability of extended sources, such as gamma-ray halos around pulsars; optimisation of the angular resolution to mitigate source confusion between known TeV sources; and studies of the energy resolution and sensitivity required to study the spectral features of PeVatrons at the highest energies. Such a facility will ideally complement contemporaneous observatories in studies of high energy astrophysical processes in our Galaxy.

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The search for Primordial Black Hole (PBH) signatures is very broad in techniques and the origin of these signatures. Searches for imprints of evaporation involve several observables such as the Extragalactic Gamma-Ray background or direct measurement of different species of cosmic rays. Using these observables, one can put very tight constraints on the PBH number density in a mass range $\sim 10^{14}$ g. To perform direct observations of the evaporation of these PBHs, one needs to perform observations in the Very High Energy gamma-ray range, either using Imaging Atmospheric Cherenkov telescopes or wide field of view gamma-ray arrays. The Southern Wide-field Gamma-ray Observatory is a projected ground-based gamma-ray detector that will be located in the Southern Hemisphere and it is now in its design phase. In this contribution, we will show the anticipated sensitivity for PBH evaporation achievable by SWGO. The results included in this proceeding and shown in this presentation were published in [1]. The details about this analysis can be found in the aforementioned reference.

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PoS(ICRC2021)891

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PoS(ICRC2021)891