Static Perfect Fluid Space and closed minimal hypersurfaces

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1 Abstract

In this study, we investigate the topological implications that arise from the existence of closed and stable (free boundary) minimal hypersurfaces in a static perfect-fluid space while ensuring that the fluid satisfies certain energy conditions. Based on the main findings, it has been established that the structure of a minimal surface or photon sphere in a static perfect fluid (or vacuum) space is dictated by the density function.