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Candidate eco-friendly gas mixtures for MPGDs

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Modern gas detectors for the detection of elementary particles, and MPGDs in particular, require F-based gases for optimal performance. Recent regulations demand the use of environmentally unfriendly F-based gases to be limited or banned. This work investigates the properties of potential eco-friendly gas candidate replacements. The aim is to discuss some of the important properties of gases for MPGDs, to list and summarize basic properties of eco-friendly refrigerants from the literature available, to discuss their properties for materials compatibility and safe use, and to make a prediction on selected parameters (i.e., ionization potentials, ionization pairs, etc) crucial for the performance of gas detectors considered by making use of both known parametrizations and quantum chemistry simulation codes.

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