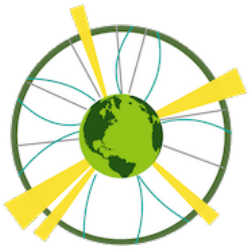

Contribution ID: **78** Type: **15 minute talk**

# Electron identification using eco-friendly gas mixture for the future ALICE 3 bRICH detector at LHC

*Wednesday 14 May 2025 12:00 (15 minutes)*

The ALICE collaboration is proposing a new apparatus, ALICE 3, to investigate the Quark Gluon Plasma (QGP) properties in heavy-ion collisions beyond current limits for the LHC Runs 5 and beyond. Precision multi-differential measurements of dielectrons are required to access the time evolution of the QGP medium and chiral symmetry restoration mechanisms. A key ALICE 3 subsystem for dielectron measurements is a proximity-focusing Ring-Imaging Cherenkov (RICH) detector covering the barrel region ($|\eta < 2|$) and using aerogel ($n$ = 1.03 at $\lambda$ = 400 nm) as Cherenkov radiator and a layer of Silicon Photomultipliers (SiPMs) for the photon detection. The state-of-the-art detector concept ensures a better than $3\sigma$ $e/\pi$ separation up to approximately 2 GeV/$c$. To further extend the $e/\pi$ separation capabilities above 4 GeV/$c$, we are investigating the possibility of filling the RICH expansion gap with a gas mixture having a refractive index of about 1.0006, acting as an additional radiator for threshold-based discrimination. Since the use of gases having large Global Warming Potential, such as fluorocarbons, should be limited, we are studying the possibility to achieve the required optical properties using mixtures of very small fractions of heavy gases with almost inert gases to ensure environmental sustainability. In this contribution the detector concept and simulation studies on the impact of the proposed implementation on dielectron measurements will be presented.

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