

The Influence of Oxygen Contamination on the Performance of a Mini-Jet-Cell-Type Drift Chamber for the JLC-CDC

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Abstract

We have studied, using cosmic rays, the influence of oxygen contamination on the performance of a test drift chamber filled with a CO₂ : iso-C₄H₁₀ (90:10) gas mixture. The test chamber has the same mini-jet-cell structure as our proposed central tracker for JLC (JLC-CDC). We observed significant deterioration of its spatial resolution with oxygen contamination in the long drift region, though the wire efficiency stayed essentially 100% up to 50 ppm over the full drift length of 5 cm. From the drift length dependence of signal charge measured at different oxygen concentrations, we calculated the electron attachment rates, which were found to be consistent with a proposed empirical expression.