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## **Simulated and measured extreme high vacuum in the jefferson lab polarized electron source**

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The polarized electron source for the Jefferson Lab CEBAF nuclear physics program has stringent vacuum requirements for successful operation. Research projects aimed at improving the static vacuum into the extreme high vacuum range, below  $10^{-10}$  Pa, have investigated outgassing rate reduction through coatings and heat treatments, vacuum characterization optimizing the utilization of commercial extreme high vacuum gauges, and pumping configurations including developments in UHV/XHV cryopumping. Additionally, limitation of dynamic vacuum during operation has been studied using surface analysis and processing toward reducing field emission from the high voltage electrode in the electron source. Both modeling and experimental results of these studies and the impact of incorporating these improvements in the vacuum system for the Jefferson Lab polarized electron source will be presented.