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Understanding nuclear charge radii with machine learning

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We present a hybrid machine-learning framework that combines high-accuracy numerical regression with symbolic regression to model and interpret nuclear charge radii. Using Light Gradient Boosting and Gaussian Process Regression with rigorous cross-validation, the method reproduces experimental trends across the nuclear chart and distills them into simple analytical expressions. These formulas naturally recover liquid-drop-like dependencies and reveal new correlations from pairing and binding energies, demonstrating data-driven discovery of physical laws in nuclear structure.

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Classification de Session: Deep Learning for Detector Signal Reconstruction and Calibration

Classification de thématique: Theory and phenomenology