

## 論文の内容の要旨

# New Methods in Strongly-Coupled Field Theories towards Quantum Gravity (強結合場の理論の新手法と量子重力理論)

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We study strongly-coupled quantum field theories and their universalities aiming to constrain the theory-space of low-energy physics, characterising the Theory of Everything. In doing so, we develop an innovative and systematic method for analysing strongly-coupled field theories, called the large-charge expansion. Applying this new method to various systems, both non-supersymmetric and supersymmetric, we make various universal predictions about higher-dimensional CFTs. The main result includes determining the entire chiral ring OPE data of,  $D = 4$ ,  $\mathcal{N} = 2$ , rank-one SCFTs, exactly to all orders perturbatively in the inverse  $R$ -charge expansion, which turned out to be a universal expression only dependent on each theory's  $a$ -anomaly.