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Bosonization analysis for artificial ”atomic collapse” in graphene

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Around a large charge with atomic number Z > 137, the QED vacuum is expected to collapse due to the strong Coulombic force. While the relativistic quantum mechanics fails to make reliable predictions for the fate of the vacuum, the heavy ion collision experiment also does not give clear understanding of this system.

Recently,the “atomic collapse” resonances were observed on graphene where an artificial nuclei can be made. In this poster, I will present our non-perturbative study of the vacuum strucutre which contains multi-body effect using bosonization method.

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