ID de Contribution: **153** Type: **Poster**

Superconductivity in a confining field-theory model

Many models of superconductivity are already present in high energy physics, since the end of last century, mainly in the study of color superconductivity in Quantum Chromodynamics and in other effective models of Strong Interactions at high densities. These models use in general a gluon propagator with specific electric and magnetic effects, resulting in an integral gap equation whose solutions are frequency dependent and could reach gaps of the order of 100 MeV. In this work, we will investigate a simple superconductivity model by changing the usual propagator of the mediator to a confining propagator, with a structure similar to that encountered in Gribov-Zwanziger and Refined Gribov-Zwanziger theories. In these theories, the gluon has an explicit mass parameter that is related with the phenomenon of confinement. Through this modification we try to explore the superconductivity of confined particles with a simple toy model with a Yukawa-type interaction. We present results for the full integral gap equations as well as for differential gap equations that arise under a series of approximations and investigate the effect of corrections originated from the new propagators. Two mass limits in the bosonic propagator must be reached: the high mass limit, reproducing the behavior of the "point like" approximation, making the gap function behave like a usual BCS superconductivity and the small mass, making the gap function behave similar to early results in color superconductivity. Solving numerically the integral gap equation, we can calculate the gap in function of the mass parameter. These calculations were performed too with improved gluon propagators, suche as the ones appearing in the Gribov-Zwanziger and Refined Gribov-Zwanziger theories. These results allow us to understand how the introduction of the explicit mass parameter to the gluon can affect the phenomenon of superconductivity in high energies. This study could be a first step towards assessing how nonperturbative confinement effects might affect the phenomenon of color superconductivity at intermediate densities.

Auteurs principaux: SAMPAIO SANTOS, João Paulo (UERJ); Prof. PALHARES, Leticia (Departamento de Física Teórica, UERJ)

Orateur: SAMPAIO SANTOS, João Paulo (UERJ)