

## [NEMESYS] Research Activities, Summary of Achievements and Perspectives.

The NEMESYS specific initiative, a condensed matter project devoted to the fundamental physics of correlated fermion and boson systems, confined to low dimensions, has involved about 20 researchers, from two Universities [Universita' della Calabria (UNICAL), Universita' di Roma Tor Vergata (ToV)] and two research institutes [Laboratori Nazionali di Frascati (LNF), Trento Institute For Fundamental Physics and Applications (TIFFPA)].

Here, we report on the massive simulations of excited state properties and collective phenomena, regarding the above mention systems, which were performed using the HPC resources, provided by the CINECA consortium, under the CINECA-INFN agreement signed in 2017.

In particular, we present the main results of the research plan (publications in high-impact factor journals), achievements (awarded computational resources and funding, e.g., Price/Iskra calls and Prin prize), and delivered open source codes.

Finally, we draw some conclusions on the status of the most advanced, realistic ab initio simulations of condensed matter systems, which will be part of future INFN proposals on the same theme.

**Primary author:** SINDONA, Antonio (CS)

**Presenter:** SINDONA, Antonio (CS)

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