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MBPT calculations with ABINIT[1] MATTEO GIANTOMASSI, Université catholique de Louvain, NAPS, Louvain-la-Neuve, Belgium, GEORG HUHS, Barcelona Supercomputing Center, DAVID WAROQUIERS, XAVIER GONZE, Université catholique de Louvain, NAPS, Louvain-la-Neuve, Belgium — Many-Body Perturbation Theory (MBPT) defines a rigorous framework for the description of excited-state properties based on the Green's function formalism. Within MBPT, one can calculate charged excitations using *e.g.* Hedin's *GW* approximation for the electron self-energy. In the same framework, neutral excitations are also well described through the solution of the Bethe-Salpeter equation (BSE). In this talk, we report on the recent developments concerning the parallelization of the MBPT algorithms available in the ABINIT code (www.abinit.org). In particular, we discuss how to improve the parallel efficiency thanks to a hybrid version that employs MPI for the coarse-grained parallelization and OpenMP (a de facto standard for parallel programming on shared memory architectures) for the fine-grained parallelization of the most CPU-intensive parts. Benchmark results obtained with the new implementation are discussed. Finally, we present results for the *GW* corrections of amorphous SiO_2 in the presence of defects and the BSE absorption spectrum.

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