**Susceptibility-based density mixing for in the CASTEP plane-wave DFT code**

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CASTEP is an ab initio DFT code which scales to the largest supercomputers and has a large feature set. I have implemented within CASTEP a susceptibility object which calculates the system's linear response to any arbitrary charge or spin perturbation. This object has been used as an alternative to Pulay and Broyden density mixing schemes which accelerate convergence of the Kohn-Sham DFT equations. This code’s memory scaling, CPU scaling, and parallelization are the same as when using Pulay and Broyden algorithms. The advantage of this approach to density mixing is that it automatically adapts to the system, without external tuning parameters. The CASTEP susceptibility object has also been used for many body perturbation theory (MBPT) alternatives to the DFT.