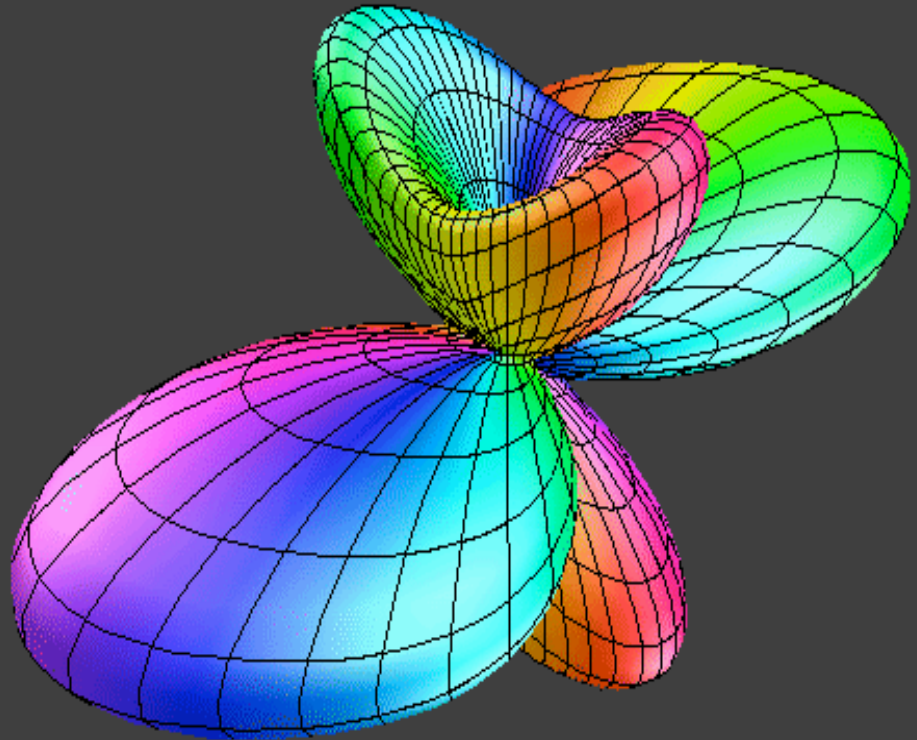


# APC

ATOMIC  
PHYSICS  
CALCULATIONS

CALCULS EN  
PHYSIQUE  
ATOMIQUE



Wave function of an atom

Atomic physics, and more particularly atomic spectroscopy, is a field with a long-standing and successful history. Advances in this domain have had and will have significant impact on progress in other fields of sciences and areas of modern technology. The study in different spectral regions of the radiation emitted by astrophysical objects or laboratory sources requires the theoretical determination of a large number of new atomic data which are urgently needed because our knowledge of the radiative and collisional properties of many atoms and ions is still very fragmentary.

During the last twenty years, substantial progress has been performed in that domain thanks to the use of sophisticated computer codes based on different theoretical approaches such as, for example, the pseudo relativistic Hartree-Fock (HFR), the SUPERSTRUCTURE (SST) and the multiconfiguration Dirac-Fock (MCDF)

## THEORETICAL CALCULATIONS IN ATOMIC PHYSICS

The increasing power of computer currently available allows now to use these theoretical techniques to model, in a realistic way, atomic structures characterized by very complex electronic configurations. As an example, accurate spectroscopic data have recently been computed for a large number of heavy atoms and ions of astrophysical interest for which relativistic effects and configuration interactions must be considered simultaneously in the physical models.

The present work has applications in different fields of physics like astrophysics, plasma physics, laser development or industry (sources manufacturing). It has been carried out in collaboration with many groups (about 40!) through the world.

Publications related to this work are listed at :

[www.ulg.ac.be/ipne/ipne/publications/00publ.html](http://www.ulg.ac.be/ipne/ipne/publications/00publ.html)



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