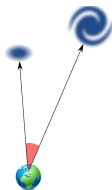


## The codes

- At CIEMAT we have used the GPUs in two areas: Cosmology (focus) and Evolutionary Algorithm
- In Cosmology, we have treated two problems: Two-Point Angular Correlation Function and Shear-Shear Correlation Function
- Both cases are analysis cases, not simulations. This is important because usually is easier to adapt simulations, especially montecarlo ones, to GPU.
- Both applications used in international projects: Dark Energy Survey (DES) and Physics of Accelerated Universe (PAU)

## 2PACF

- Speedup related to CPU implementation  
35186 s, sample 450000 galaxies
- Speedup: 115 (GPU-GTX295), 117 (GPU-C2050), OpenMP(8 cores) 10, MPI (64 cores) 87, MPI(128 cores) 171.
- It calculates how many galaxies are under a subtended angle. Involve histogram construction.



## shear-shear

- Involve the correlation between the shapes of two galaxies.
- Harder trigonometric calculations than 2PACF.
- Involve histogram construction.
- Speedup related to the previous reference code (Athena, CPU, 247681 s) 68, sample 40000 galaxies

## Remarks for both codes

- CIEMAT owner, not external dependences or shared ownership.
- Accessibility to public data (CFHTLens survey)
- Physical output checked as correct by cosmologists
- In conclusion, able to run demo

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