Agenda of this session

- This talk: Towards a Preliminary Technical Design
- DISCUSSION
- Introduction to MACHETE (do we need it?)
- MORE DISCUSSION
- Technical solutions and cost estimate.
- EVEN MORE DISCUSSION

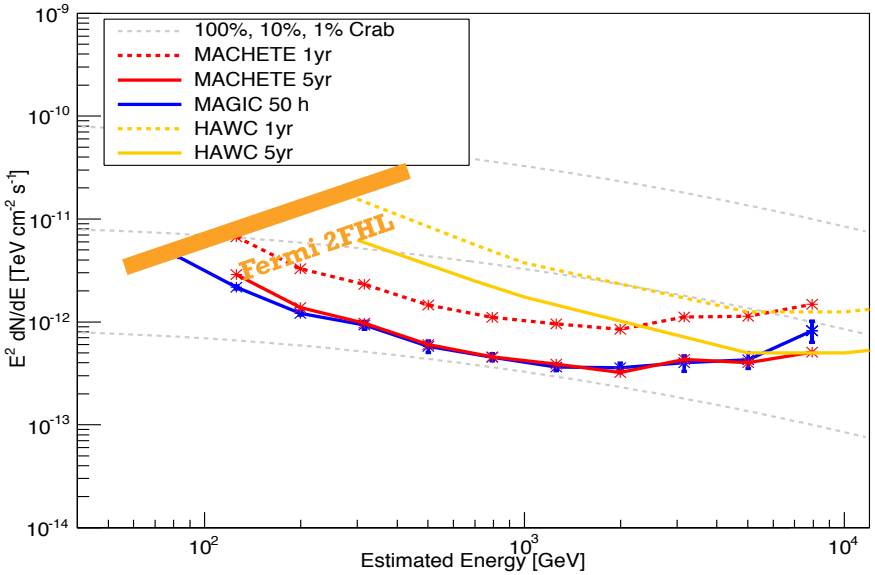
MACHETE: towards a Preliminary Technical Design

J. Cortina, Zurich, June 14th, 2016

The "experimental context": HAWC, Fermi

- **HAWC** is taking data. There are plans to build HAWC-South. We don't know the performance of HAWC-South but sensitivity, angular and spectral resolution of HAWC are much poorer than MACHETE and threshold is much higher.

- **Fermi-LAT** will have taken 10 years of data by the time MACHETE is there, but covers lower energies and is not as sensitive to fast transients (<1 day). Some day it will be de-orbited.



The "experimental context": CTA

- MACHETE will compete with CTA for a fraction of the physics:
  - Extragalactic survey of MACHETE is as good as proposed survey of CTA.
  - MACHETE can provide some of the triggers for transients and AGNs that are included in CTA KSPs.
  - However MACHETE is a dedicated experiment: CTA cannot spend its whole time on systematically looking for transients.
- MACHETE will compete with CTA for funds and manpower:
  - Both Abelardo and Juan have strong roles in CTA and are trying to secure funding of CTA.
  - It is not only about the money: jumping into another experiment would look like we are not sure about CTA.

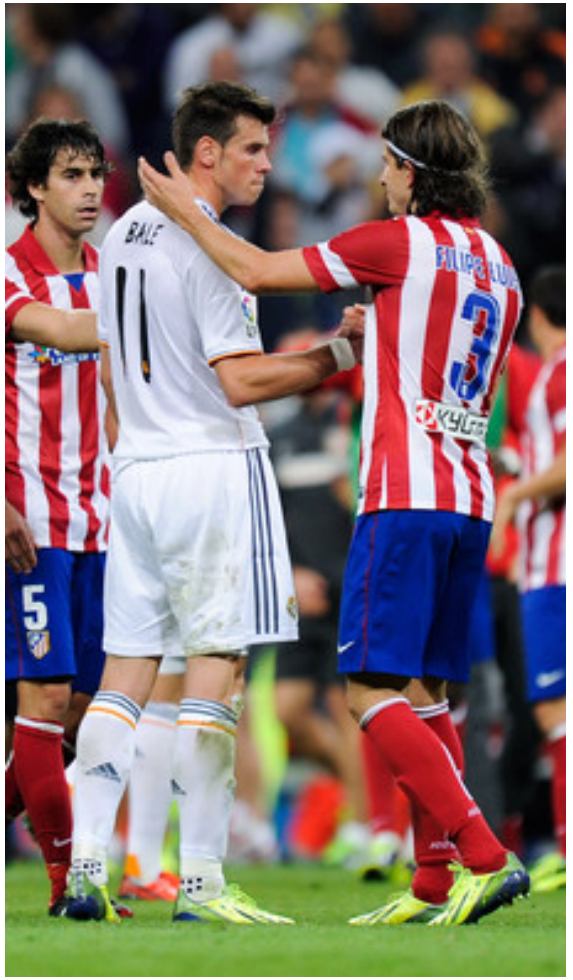
The "experimental context": staged-CTA

- New in the last months: only ~60% of the full budget of CTA is secured. CTA plans to stage construction, i.e. start with only ~60% of the telescopes. The full array will not be ready for the first 10 (?) years even after construction is finished, i.e. no full array before ~2033.

- Staged array by 2022 (?)= 4 LSTs + few (5?) MSTs in CTA-N and no LSTs + ~60% (15?) in CTA-S.
  - 4 LSTs will be built in CTA-N. They are especially good for transients and transients are MACHETE's main target. Good match if MACHETE is near CTA-N (La Palma or Tenerife) to maximize common observations.
  - Hard to make extragalactic survey either with CTA-S due to competition, or in CTA-N due to lack of telescopes. This gives MACHETE an option to beat CTA also in the extragalactic survey.

MACHETE and CTA

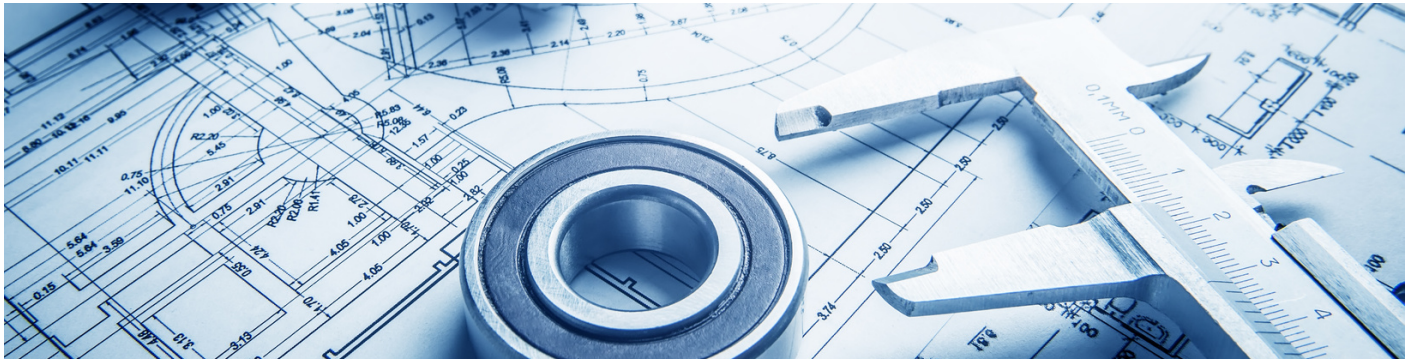
- MACHETE may have become an integral part of CTA if it had been proposed before the concept of CTA was complete. Now it is too late.
- It is probably better to keep them separate, but sign a cooperation agreement with CTA so that:
  - MACHETE delivers triggers and positions of new sources to CTA and members of MACHETE get included in corresponding papers.
  - MACHETE can use CTA's analysis and MC software, data formats (in principle CTA plans to open its software).



Launching MACHETE

- I am personally very busy with LST until Spring 2017. Then design of LST and the installation of LST1 are over. Similar for many Spaniards because the Spanish money will flow through IAC and will mainly go to companies. However we can get some money at IFAE for design studies and limited prototyping.
- Hopefully detailed plans and construction schedule of CTA will settle by the end of 2016 (otherwise even better for MACHETE!). That's important to estimate our funding chances.
- MACHETE has been presented at several places: ICRC, La Palma, UCLA, Fermi symposium, internal workshop at MPK Heidelberg.
  - No technical or scientific objections raised.
  - Critics has focused on cost. It is clear that we need a more realistic cost estimate.

Preliminary Technical Design



- My proposal: finish a Preliminary Technical Design Report by Summer 2017, including a realistic cost estimate.

- **IF** we are satisfied with:
  1. technical solutions
  2. expected performance -> physics impact
  3. cost

we can apply for funding of full-scale prototype or key elements.

- This meeting: who would like to participate?