HiggsCP meeting

Anne-Catherine Le Bihan – Saskia Falke
– Océane Poncet (Master student) - Mario Sessini

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Outline

→ All fully hadronic channels and channels including a muon have been re-invastigated and first results are summarized here :

https://cernbox.cern.ch/index.php/s/poRuOSMTjcacWiU

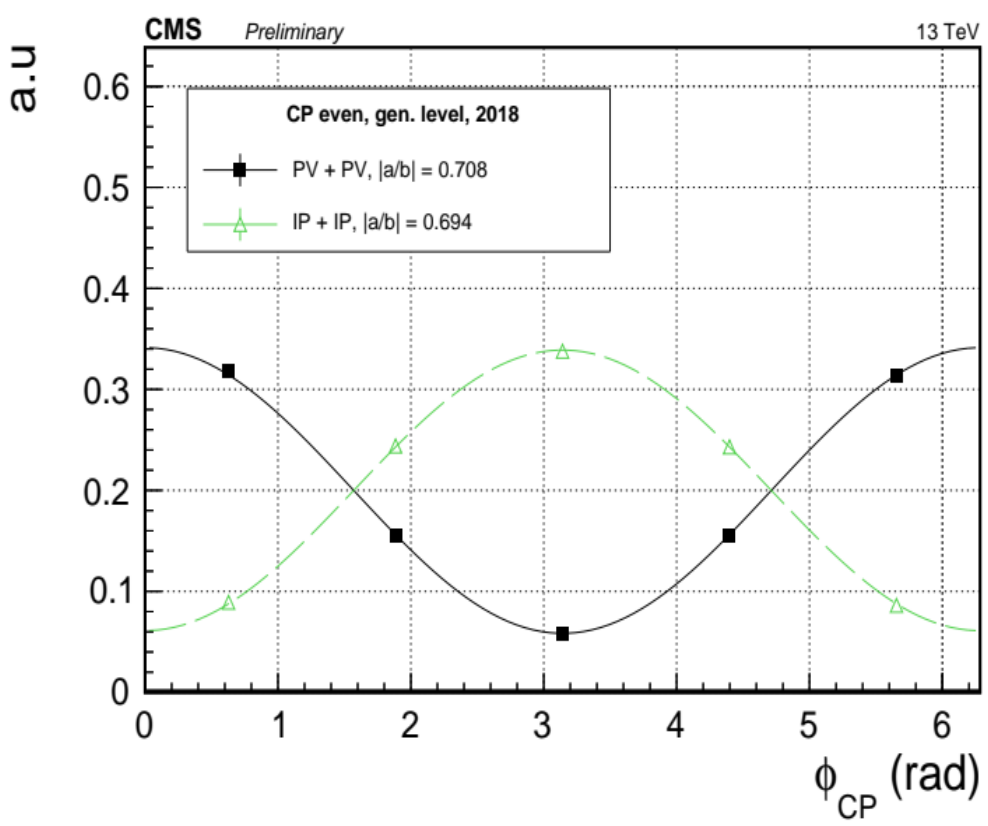
→ Basically any channel's sensitivity can be improved by using the polarimetric vector instead of the NP method

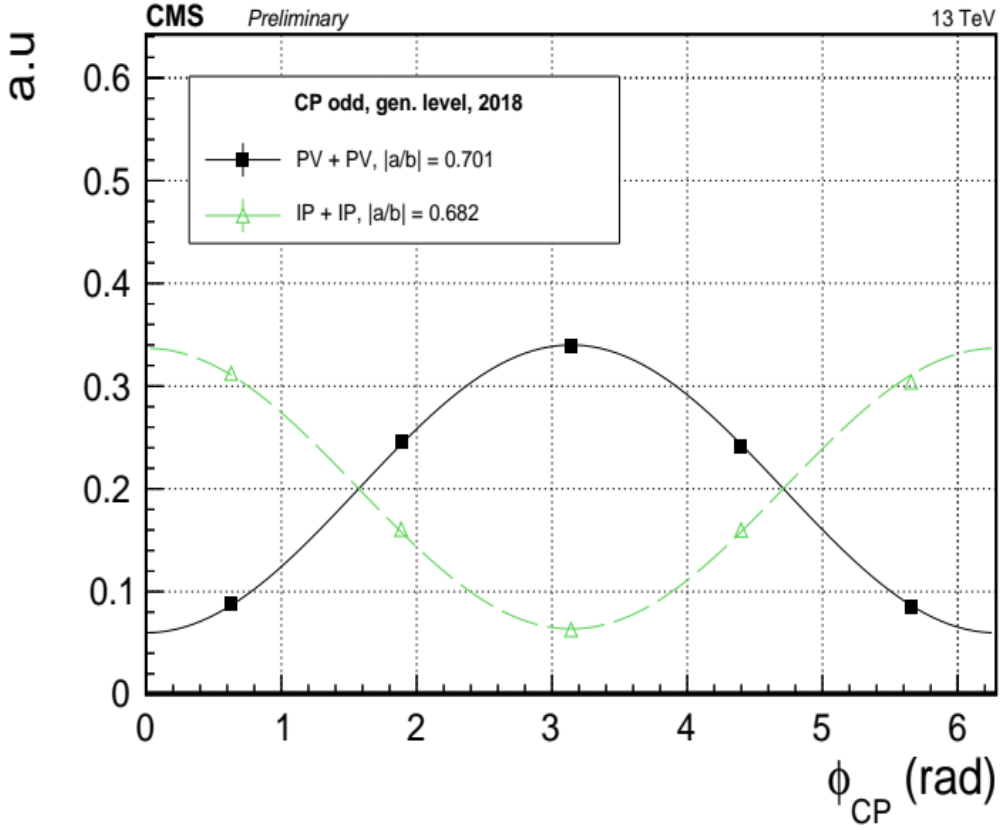
→ Easiest improvement can be obtained from 3prongs decays

→ Replacing the IP method is not worth

→ SVFit and FastMTT used alone does not allow to get any sensitivity to CP state : use both together

Generated $H \to \tau\tau \to \pi + \pi$

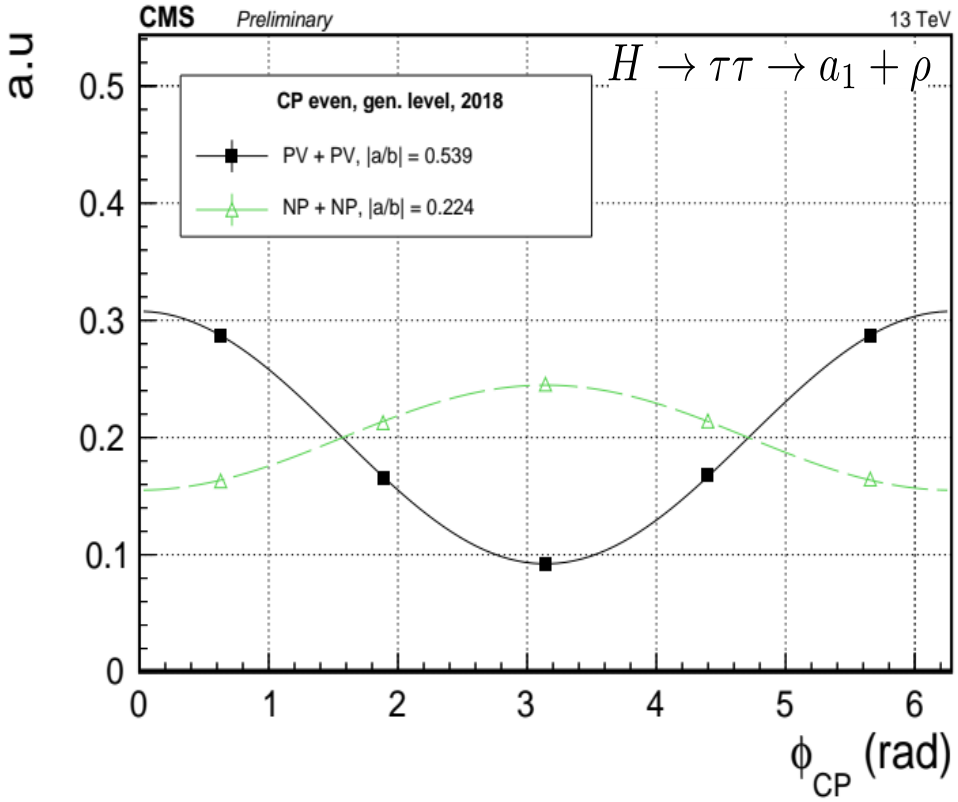


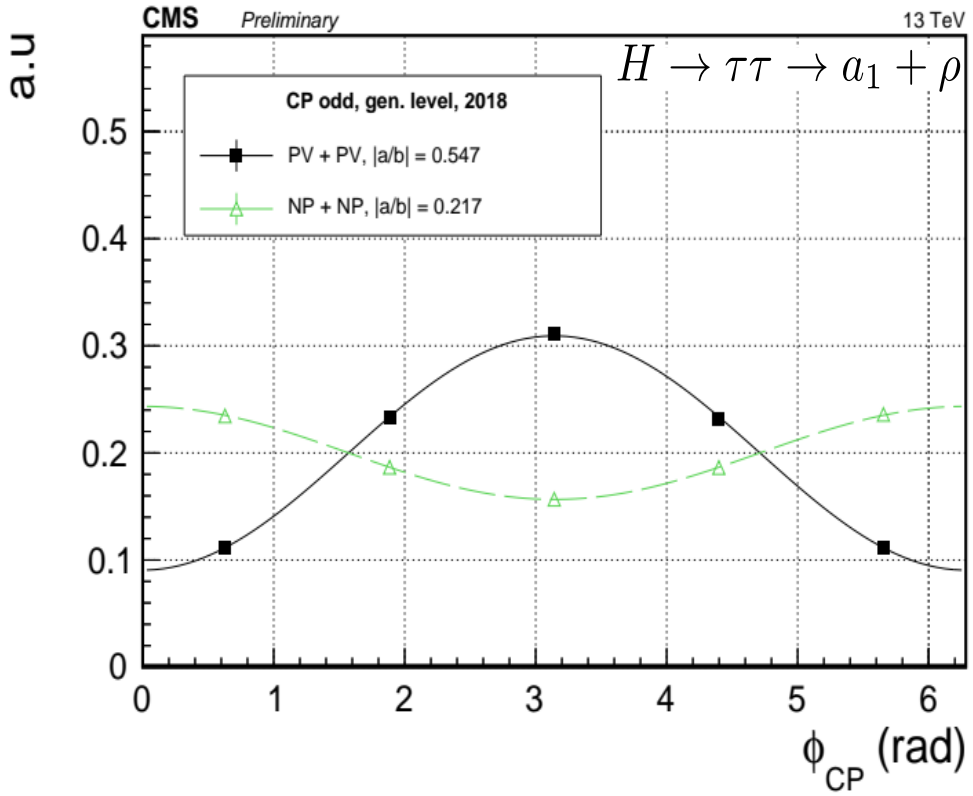


→ Nothing much to gain from replacing the impact parameter

→ Especially if one take into account the inevitable loss of sensitivity from tau reconstruction

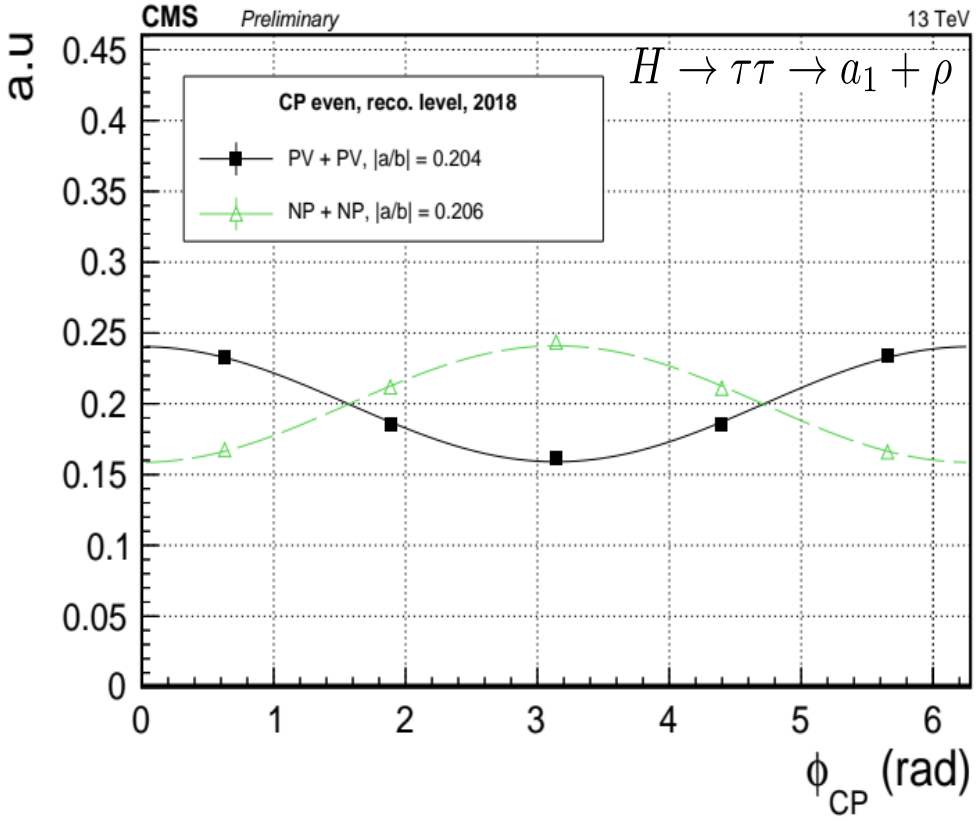
Generated $H \to \tau\tau \to a_1 + \rho$

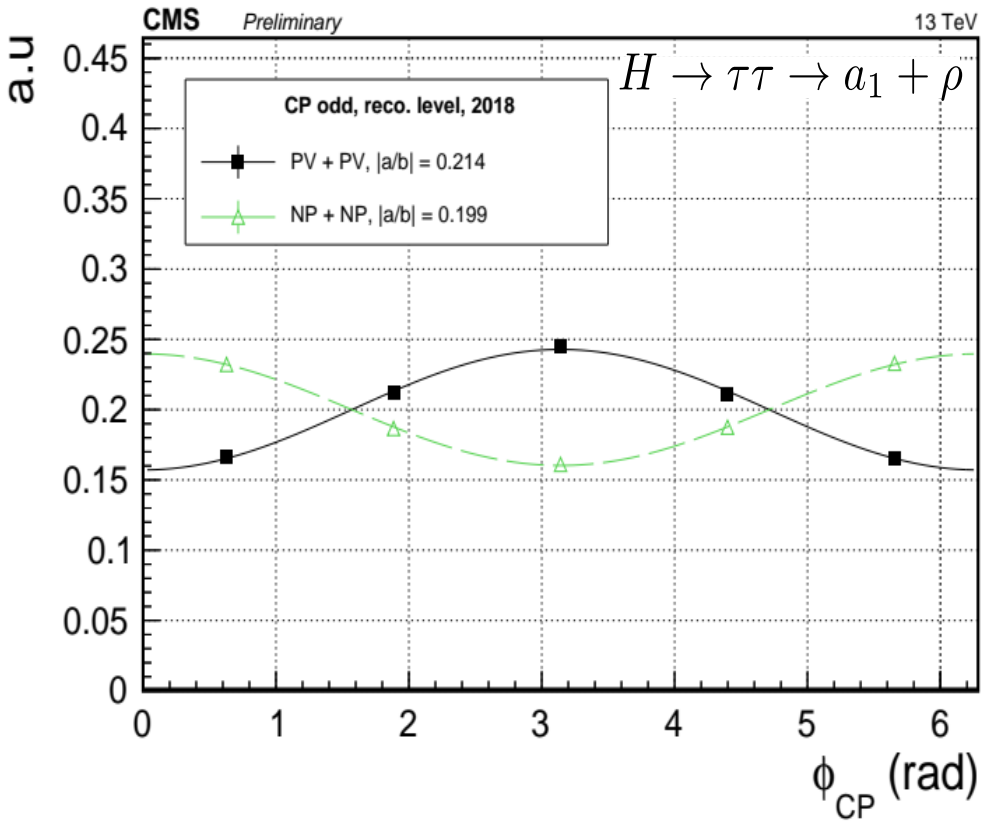




→ Great improvement of the amplitude from the usage of the polarimetric vector at generated level

Reconstructed $H \to \tau\tau \to a_1 + \rho$



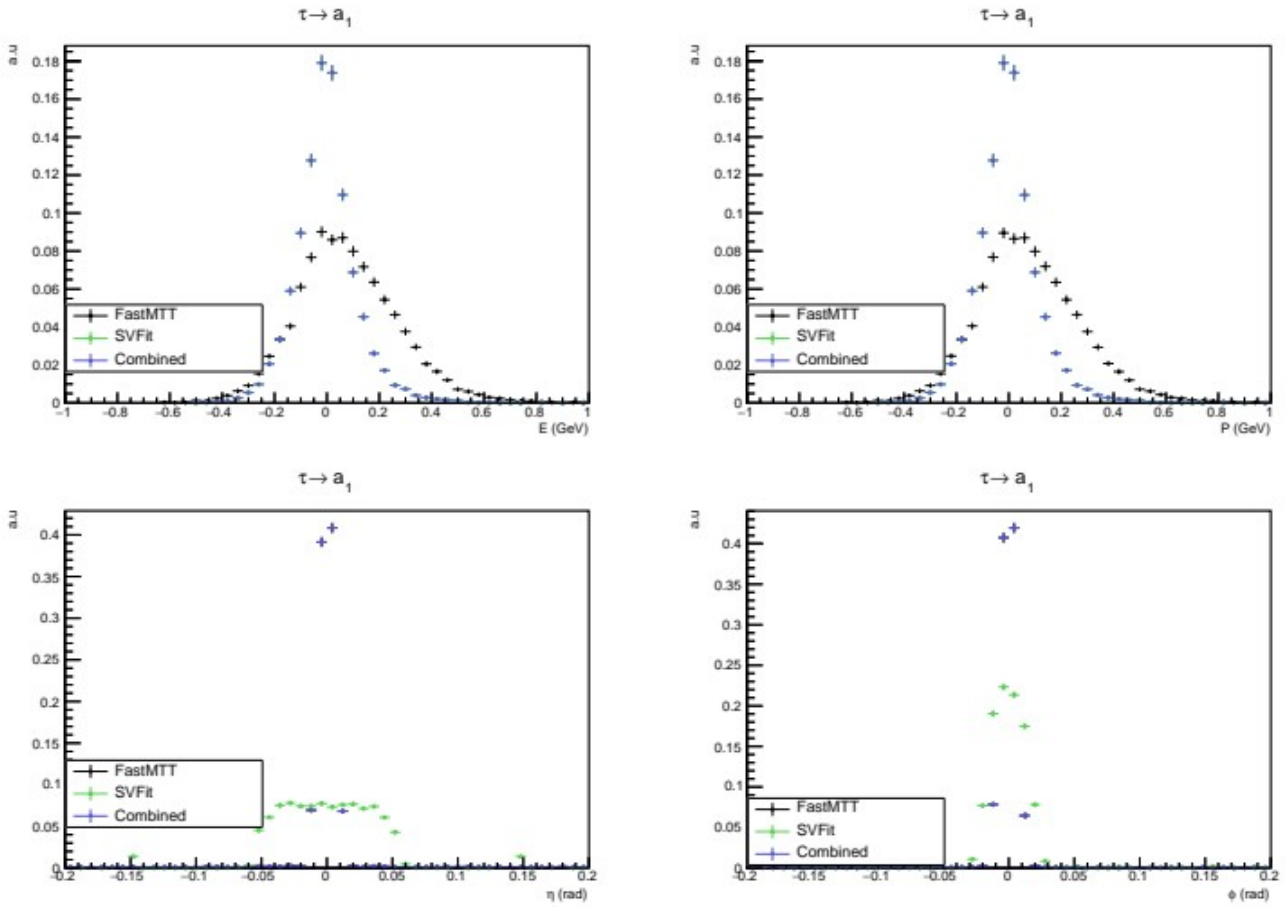


→ Possible improvement at reconstructed level, greatly limited by tau reconstruction performance…

→ Similar results observed from rho+rho channel

SVFit and FastMTT mixed together

$$P_\tau = (||\vec{P}_{SVFit}|| \times \vec{n}_{FastMTT}, E_{SVFit})$$



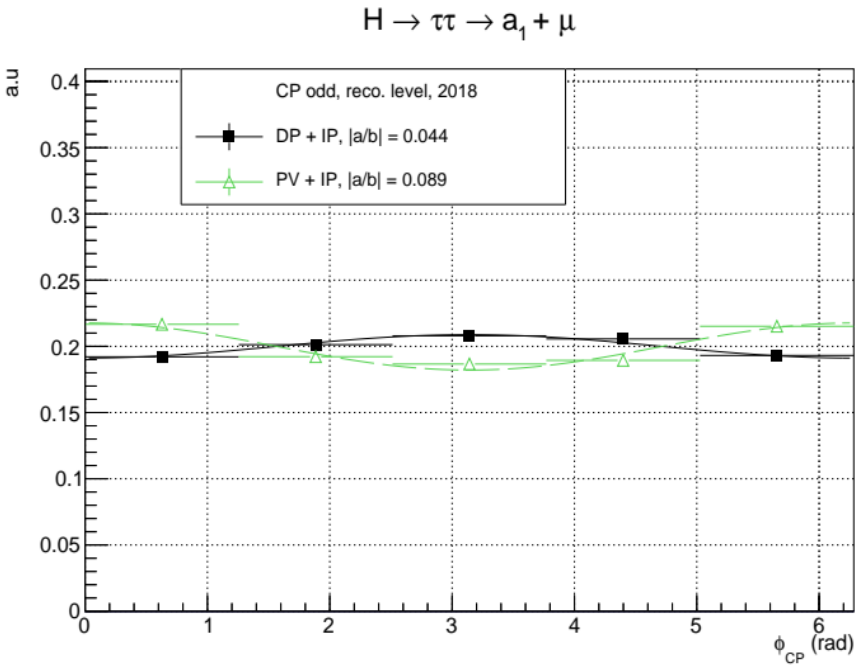
Blue dots are overlapping

Current work

→ Improvement seen in the a1+mu channel using the PV with the GEF algorithm (presentation from last year)

→ Getting our framework ready for a full analysis including all corrections and systematics

→ Planning to measure the sensitivity from this channel with Run-2 data



→ Starting a new project of ML based tau reconstruction algorithm with Konstantin Androsov, TauID/TauML members and DESY colleagues

→ This algorithm aims to be optimized for angular resolution

→ Good correlation with energy should not be neglected in any case