

# Comunicazioni

# CSN1

**Consiglio di Sezione  
Milano, 5 giugno 2018**

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**Sezione di Milano**

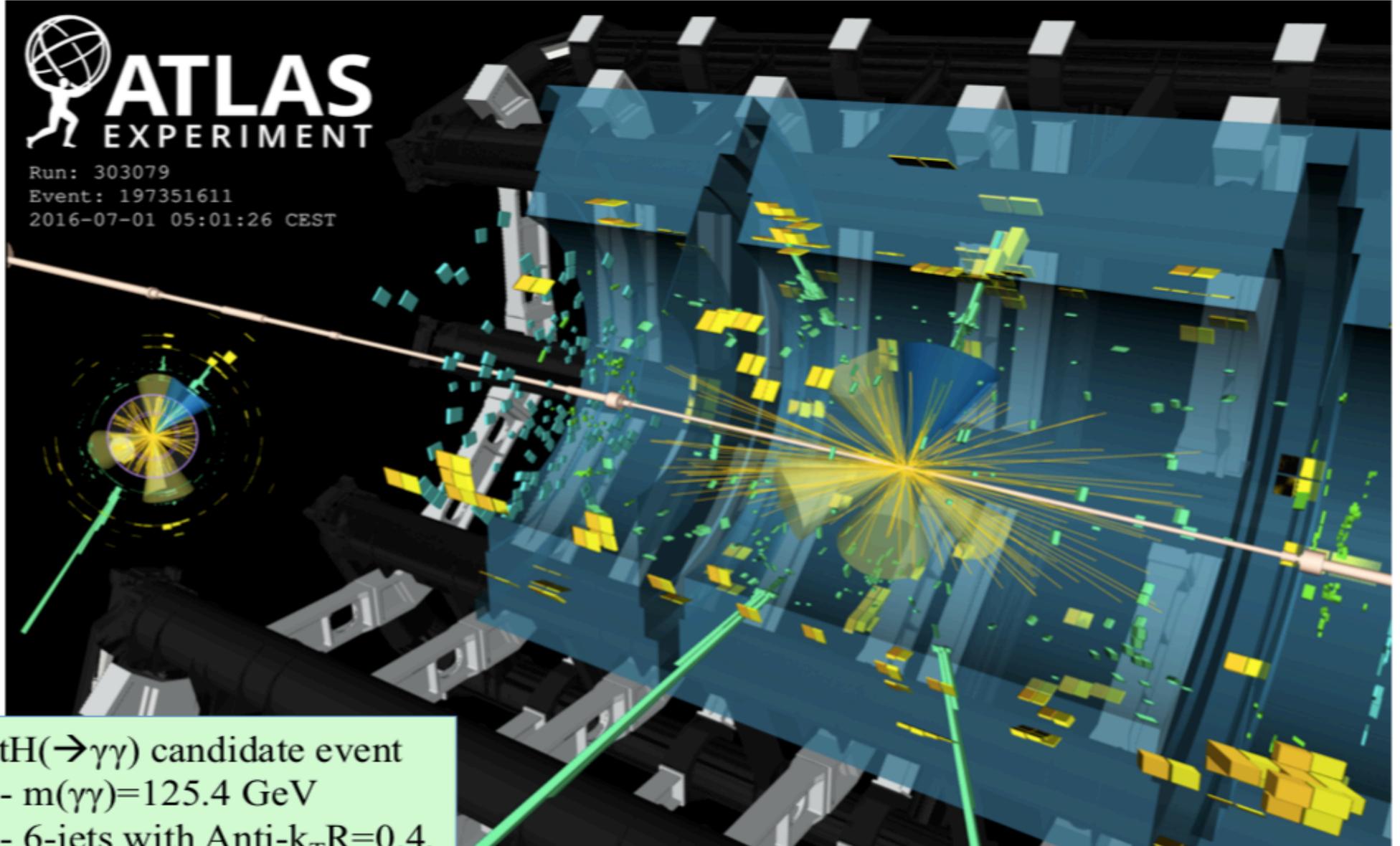
# Higgs production associated with a top quark pair

 **ATLAS**  
EXPERIMENT

Run: 303079

Event: 197351611

2016-07-01 05:01:26 CEST



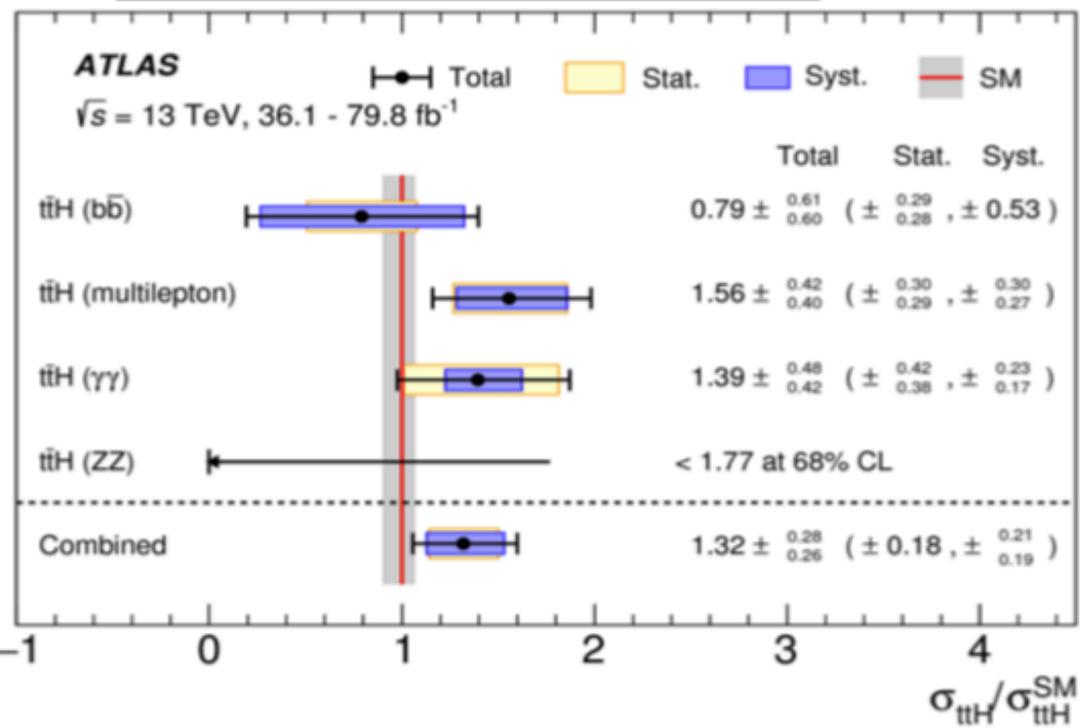
$ttH(\rightarrow\gamma\gamma)$  candidate event  
--  $m(\gamma\gamma)=125.4$  GeV  
-- 6-jets with Anti- $k_T R=0.4$ ,  
incl one b-tagged jet



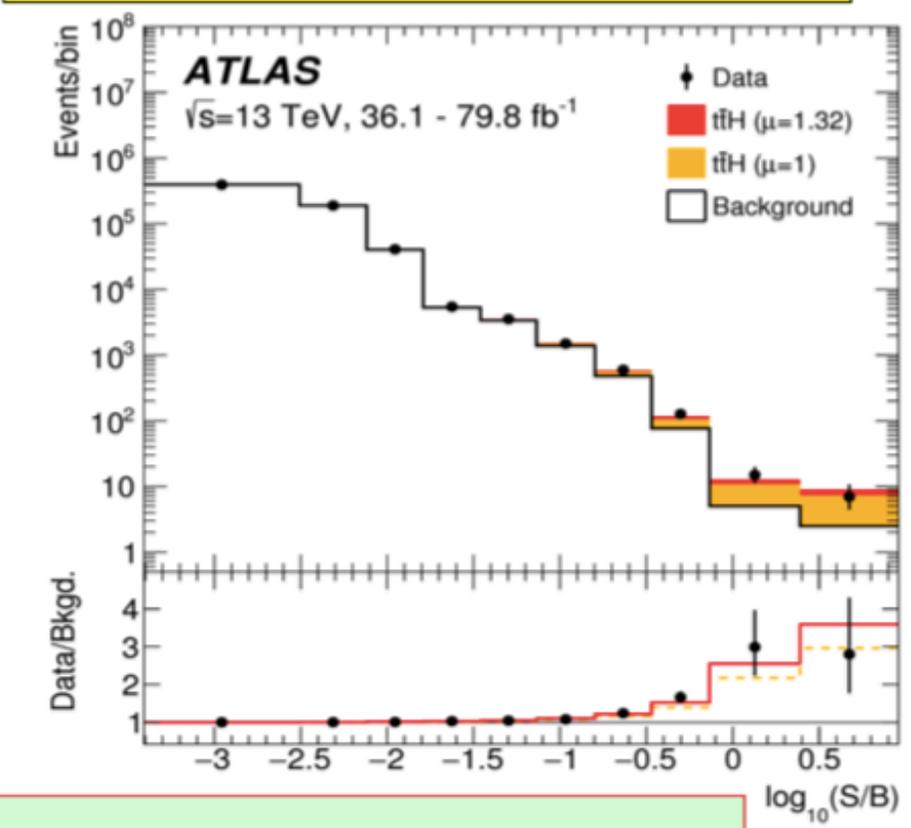
# ttH with 36.1-79.7 fb<sup>-1</sup>

- 79.8 fb<sup>-1</sup> ttH( $\gamma\gamma, ZZ \rightarrow 4l$ ) result was combined with 36.1 fb<sup>-1</sup> ttH(bb, multi-lepton), as well as with the Run-1 result

ttH measured / SM cross section



Event yield as a function of log10(S/B)

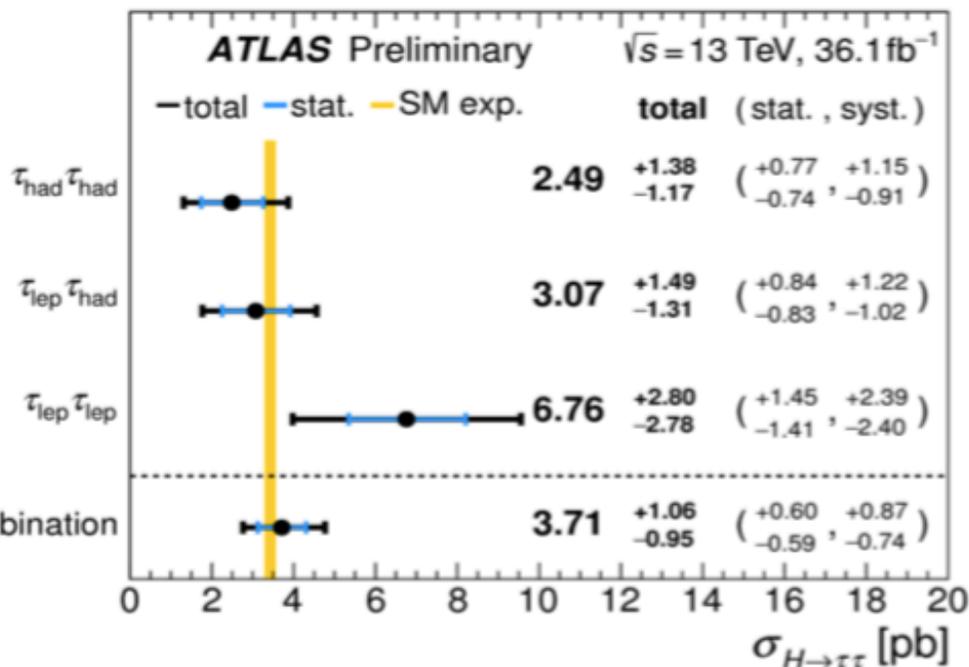


**Observation of ttH production with:**  
 -- Run-2 alone: **5.8  $\sigma$**  significance (4.9  $\sigma$  expected)  
 -- Run-1 and Run-2 combined: **6.3  $\sigma$**  significance (5.1  $\sigma$  expected)

# $H \rightarrow \tau\tau$ @ 13 TeV

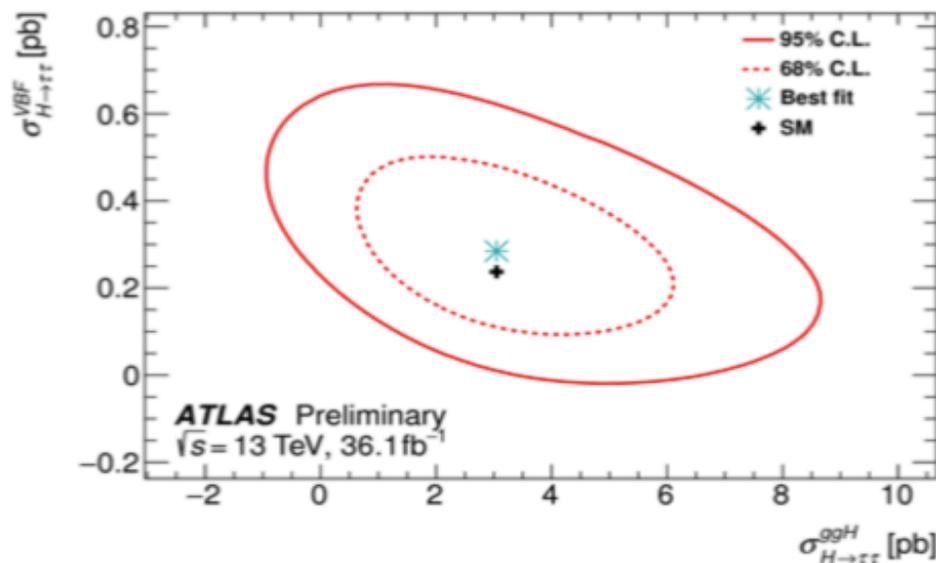
- Reminder: Run-1 ATLAS data alone:  $4.5 \sigma$  significance ( $3.4 \sigma$  expected)
- New today at LHCP: cross section measurement with Run-2  $36.1 \text{ fb}^{-1}$ 
  - VBF and boosted (mostly ggF) categories with 3 decay channels

## Measured / SM cross section



The measured cross sections agree with SM prediction

## VBF vs. ggF cross section



$$\sigma_{H \rightarrow \tau\tau}^{\text{ggH}} = 3.0 \pm 1.0 \text{ (stat.)}^{+1.7}_{-1.3} \text{ (syst.) pb}$$

$$\sigma_{H \rightarrow \tau\tau}^{\text{VBF}} = 0.28 \pm 0.09 \text{ (stat.)}^{+0.11}_{-0.09} \text{ (syst.) pb}$$

**Combined Run-1 and Run-2 significance:  $6.4 \sigma$  ( $5.4 \sigma$  expected)**

# Breve stato Fase2 ATLAS/CMS

- ✓ R&D nuovi apparati @ CSN1 ( ~ 2.2 Meu 2014-2017)  
→ **ancora in corso per definire disegno finale**
- ✓ Prima proposta piano finanziario nel 2015
- ✓ Piano di lavoro presentato al CTS (12 febbraio 2018)
- ✓ Approvazione Giunta: contributo CORE e spesa complessiva
- ✓ Quasi completata Review TDR @ CERN: LHCC e UCG  
→ **MONEY MATRIX @ RRB Aprile 2018**
- ✓ **Conferma dai Direttori: impegno infrastrutture/personale**
- ✓ Referaggio CSN1 in fase di chiusura per maggio 2018  
→ **documenti esperimenti @ CTS**
- ✓ Discussione CTS luglio 2018: richiesta personale dedicato  
→ **MONEY MATRIX FINALE RRB Ottobre 2018**

# Investimento per il futuro

- **UA9/sviluppo di cristalli per manipolazione fasci:**
  - collimazione LHC → accordo CERN – ancora da firmare!!
  - **Ultimi test perfetti → RICHIESTA FINANZIAMENTO MATERIALE/FORNO**
  - estrazione fascio: ERC e applicazione a LHCb – in fase di studio
- **P-SHIP @ CERN**
- **MuONE @ CERN → dotazioni**
- **MOEDAL @ CERN → dotazioni**
- **RD51 @ CERN: MPGD**
- **RD50 @ CERN: sensori silicio**
- **RD\_FA:**
  - Fisica
  - Collisori e+e-: CepC – FCC\_ee → R&D IDEA
  - PID/EIC → in CSN3 dal 2019
  - Muon Collider: LEMMA e simulazioni fondi

Update EU Strategy