CTA Science Alert Generation: integration with science tools

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Gammapy Co-Working Week, November 2020

RTA-SCI and gammapy implementation

gammapy coding sprint results

- gammapy contact people: B. Khélifi, R. Terrier, J.E. Ruiz

- RTA-SCI pipeline implementation:
  - a stand-alone python wrapper - not implemented in RTA-SCI - has been prepared reading from a FITS event file
  - list of ctools functionality currently used has been defined to be replicated in gammapy:
    - selection of events
    - IRF loading
    - binned 3D analysis (position and slope fixed, only flux varying)
    - output: TS and flux
  - R. Terrier prepared and shared a python notebook with the gammapy analysis
  - discussion on interfaces:
    - ctools and gammapy reading the same event FITS file
    - no use of XML, but models and configuration can be set-up using YAML
    - need for common input logic of configuration informations
    - no TS is given directly in output information but it can be extracted

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- comparison with current RTA science results using gammapy:
  - can gammapy … ?
    - Blind-search algorithm
      - YES
    - Localisation performance near the sensitivity limit
      - YES
    - Full FOV maximum likelihood
      - YES with use of background model and background ring extraction
    - On/off analysis (wobble, reflection)
      - YES with Li&Ma and fitting method
    - time variable models for transient detection
      - We provided a gammapy implementation of a power law temporal decay model using the GRB GRB190114C as use case
      - Thanks to the gammapy support (Axel), we fixed the problems of our pipeline with the last gammapy release (0.18.2)
      - after a scientific validation, we will be ready for a pull request in the gammapy repo.

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- RTA-SCI performance optimization
  - several ideas shared on how optimizing the analysis time depending on the use case (e.g. stacking can add event bunchs to the analysis)
  - a dedicated discussion will be organized on the functional optimization