# Detection methods for the Cherenkov Telescope Array at very-short exposure times

Tuesday 13 July 2021 12:24 (12 minutes)

The Cherenkov Telescope Array (CTA) will be the next generation ground-based observatory for very-highenergy gamma-ray astronomy, with the deployment of tens of highly sensitive and fast-reacting Cherenkov telescopes. It will cover a wide energy range (20 GeV - 300 TeV) with unprecedented sensitivity. Our study is focused on real-time detection at very-short timescales (from 1 to 100 seconds). We built and characterised an analysis and detection pipeline and tested it via the verification of the Wilks'theorem for false-positives. The performance was evaluated in terms of sky localisation accuracy, detection significance and detection efficiency for different observing and analysis configurations. Our goal is to determine the feasibility of the analysis methods at very-short exposure times. We also investigated the sensitivity degradation which is expected in a real-time analysis context and compared it to the requirement of being better than half of the CTA sensitivity. In this work, we present a general overview of the pipeline and the performance obtained for the use-case of a blind-search and detection following an external alert, such as from a gamma-ray burst or a gravitational wave event.

# Keywords

very-short exposure times; blind detection; transients; real-time analysis;

#### Collaboration

CTA

## other Collaboration

## Subcategory

Experimental Methods & Instrumentation

**Primary authors:** DI PIANO, Ambra (INAF/OAS Bologna); Dr BULGARELLI, Andrea (INAF/OAS Bologna); Dr FIORETTI, Valentina (INAF/OAS Bologna); PARMIGGIANI, Nicolò (Università degli Studi di Modena e Reggio Emilia and INAF/OAS Bologna); Mr BARONCELLI, Leonardo (INAF/OAS Bologna); Dr STRATTA, Giulia (INAF/OAS Bologna and INFN Sezione di Firenze); DE CESARE, Giovanni (INAF/OAS Bologna); STAMERRA, Antonio (INAF); LONGO, Francesco (Universita degli Studi di Trieste and INFN Sezione di Trieste); LÓPEZ-ORAMAS, Alicia (Instituto de Astrofisica de Canarias and Departamento de Astrofisica, Universidad de La Laguna); FOR THE CTA CONSOR-TIUM

Presenter: DI PIANO, Ambra (INAF/OAS Bologna)

Session Classification: Discussion

Track Classification: Scientific Field: GAI | Gamma Ray Indirect