

Complex analysis of Askaryan Radiation: UHECR and UHE- ν Reconstruction with Analytic Signals

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Summary

UHECR and UHE- ν Reconstruction with Analytic Signals

1. Introduction:

- A fully analytic Askaryan E-field model in the time-domain [3]
- Based on work begun with Prof. Amy Connolly [2]
- Based on work begun by J. Ralston and R. Buniy [1]
- Advantages: (i) extract UHE- ν cascade parameters by fitting model to raw voltage traces, (ii) fast and simple, (iii) analytic equations may be embedded as event filter

2. UHECR and UHE- ν identification:

- A fully analytic Askaryan voltage model, time-domain [this work]
- Equations for both voltage trace, and envelope of voltage trace
- Verification with NuRadioMC: strong thermal background rejection, signal identification, and (rough) $\log_{10}(E_\nu)$ estimate

3. Correlation with Recent ARA observations of UHECR

Bibliography

Bibliography

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