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Columnar data analysis with ATLAS analysis formats

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Future analysis of ATLAS data will involve new small-sized analysis formats to cope with the increased storage needs. The smallest of these, named DAOD_PHYSLITE, has calibrations already applied to allow fast downstream analysis and avoid the need for further analysis-specific intermediate formats. This allows for application of the "columnar analysis" paradigm where operations are applied on a per-array instead of a per-event basis. We will present methods to read the data into memory, using Uproot, and also discuss I/O aspects of columnar data and alternatives to the ROOT data format. Furthermore, we will show a representation of the event data model using the Awkward Array package and present proof of concept for a simple analysis application.

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