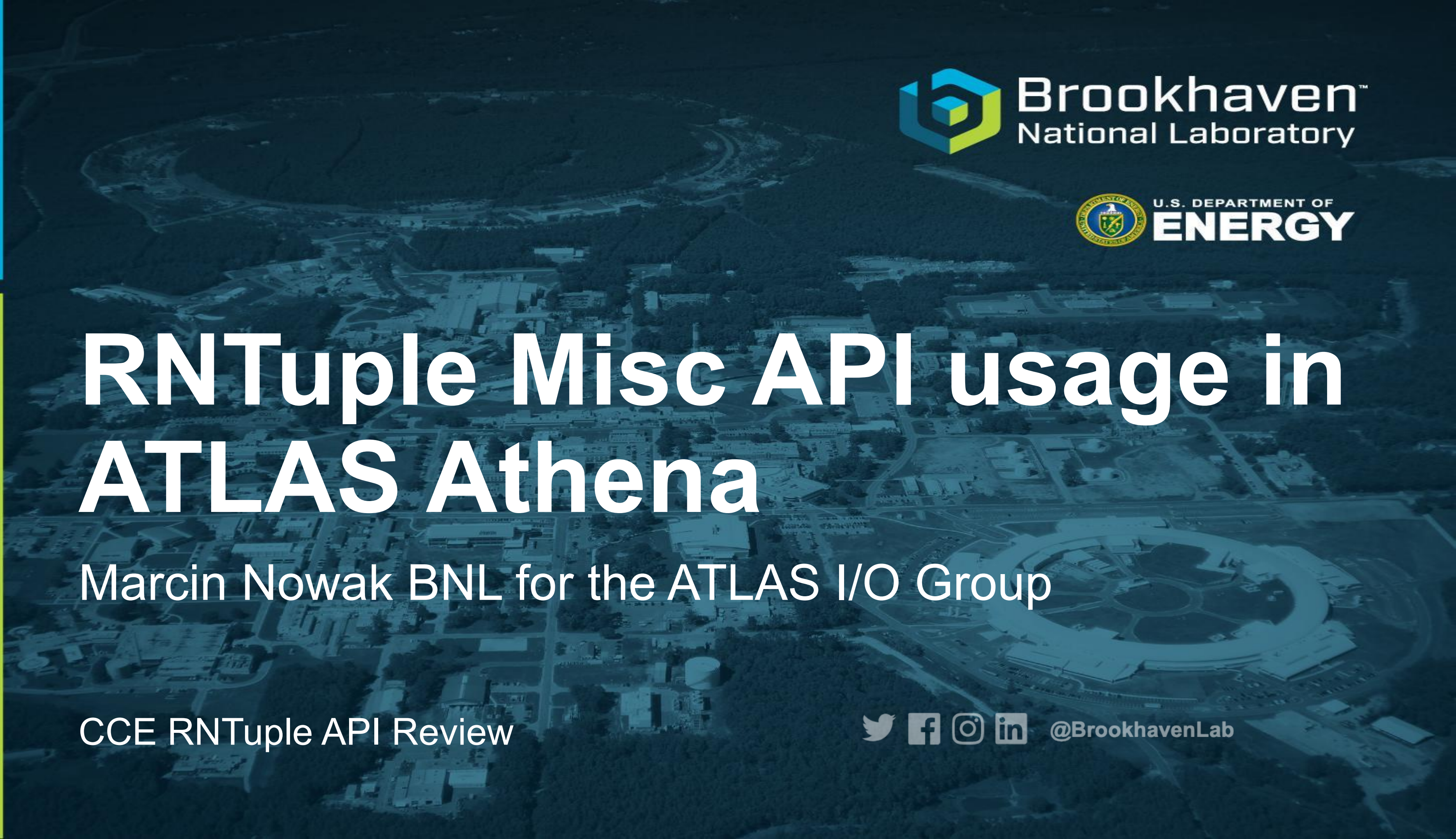

Brookhaven National Laboratory

U.S. DEPARTMENT OF ENERGY

RNTuple Misc API usage in ATLAS Athena

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CCE RNTuple API Review

@BrookhavenLab

RNTupleDescriptor

```
for( const auto &field : m_ntupleReader->GetDescriptor().GetTopLevelFields() )
     if( field.GetFieldName().starts_with( the_right_prefix )
           view_p = std::make_unique< RNTupleView<void,true> > (
                      m_ntupleReader->GetView<void>(field.GetFieldName(), nullptr) );
```

- We use the Descriptor as a source of information about all the top-level fields in the RNTuple, when reading in Athena (C++)
- For performance we try to get a View for selected fields and keep it “forever”
- It’s not possible to have an uninitialized View as a class member, so we need to use a pointer

RNTuple Inspection

```
inspector = ROOT.Experimental.RNTupleInspector.Create( rntuple )
diskSize = inspector.GetCompressedSize() / Units.kb
memSize = inspector.GetUncompressedSize() / Units.kb

descriptor = ROOT.Experimental.RNTupleReader.Open( rntuple ).GetDescriptor()
for fieldDescriptor in descriptor.GetFieldIterable( descriptor.GetFieldZeroId() ):
     fieldTreeInspector = inspector.GetFieldTreeInspector( fieldDescriptor.GetId() )
     diskSize = fieldTreeInspector.GetCompressedSize() / Units.kb
     memSize = fieldTreeInspector.GetUncompressedSize() / Units.kb
```

- Example of using `RNTupleInspector` and `RFieldTreeInspector` in ATLAS python tools
- Also an example of using `RNTupleDescriptor` to iterate over all Fields

RPageSource

- Our first RNTuple interface in Athena was based on RNTupleReader/Writer
- At the last CHEP we noticed that many ROOT reports were based on RPageSource
  - We switched to RPageSource thinking this is the “power user” API
- Turns out RPageSource is more like internal API and RNTupleReader provides more customisation options, e.g. for concurrency
  - So we now switched back to RNTupleReader
- I am not sure which API is better when working with ObjectStores
  - We would like to do something with ObjectStores soon - it’s the only missing milestone from the ATLAS RNTuple Demonstrator project

Final Remarks

- Seems the current API is sufficient for ATLAS
- We think we miss some customisation options, e.g. controlling the page size for a given Field
- Possible discussion:
  - Field Views
  - ObjectStores