

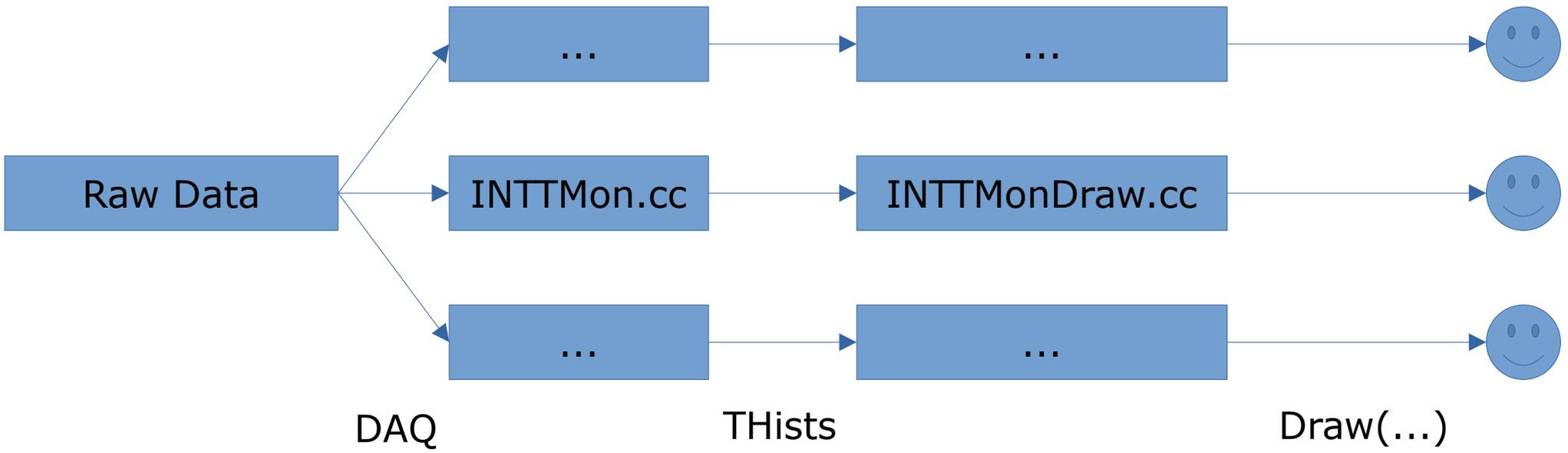
# **INTT Online Monitoring**

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Cheng-Wei Shih

# Online Monitoring Overview

- Raw data passed to OnlMon servers via the DAQ
- OnlMon servers parse the data and pass to OnlMon clients as histograms
- OnlMon clients contain drawing methods to show detector status
- Monitoring crew invokes those methods to view detector status

# Online Monitoring Overview



# Online Monitoring Overview

- Goal:
  - Create a package that can visualize the INTT in an intuitive way
- Easy to use
  - Drawing schemes that highlight chips based on the likelihood there is a problem
  - Simple and interactive interface

# INTT OnlMon Progress

- Implemented virtual functions inherited from OnlMon; can be merged to the main branch in GitHub (want to do more cleanup first)
- Cleaned up the structure of InttMon
  - Previous had high-dimensional arrays (dimension for layer...channel) to store information
  - Current method is a single TH1D or TH2D with a bin per each unique channel (devised and checked simple indexing scheme between bin and layer..channel indices)
  - Cleaner/easier loops over the INTT substructure

# INTT OnlMon Progress

- Implemented AutoExec functionality
  - A TPad with TText shows the layer, ladder, north/south, and chip indices for where the user's mouse is
  - Clicking on a part of the main TCanvas creates a pop-up that shows detail at the channel level for that part of the INTT
- Using the OnlMon framework
  - Previous debugging/testing was done with macros
  - Current version compiles with the OnlMon framework
  - Simple macros can run the server or client
  - Information is sent and retrieved using the framework

# INTT OnlMon Showcase

- In a ROOT session, ran a macro that:
  - Creates an instance of InttMon
  - Initialize it and prepares the OnlMon framework
  - Runs 1 event
    - Uses TRandom with a fixed seed instead of unpacker and real events
    - Generates a Poisson distributed random number of hits for this event (mean 16, seed chooses 12 hits)
    - Randomly chooses locations for these hits
    - Outputs chosen locations to screen (printf...)
    - Updates the appropriate histograms and DBVars

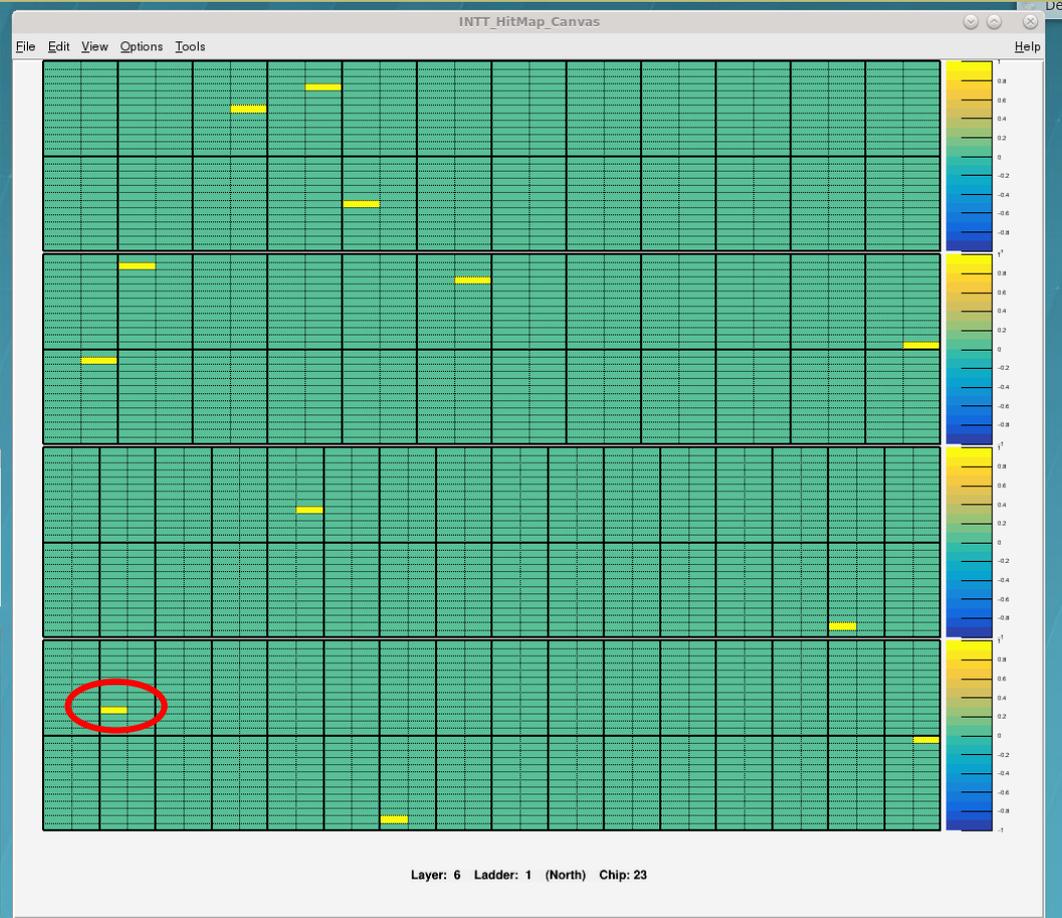
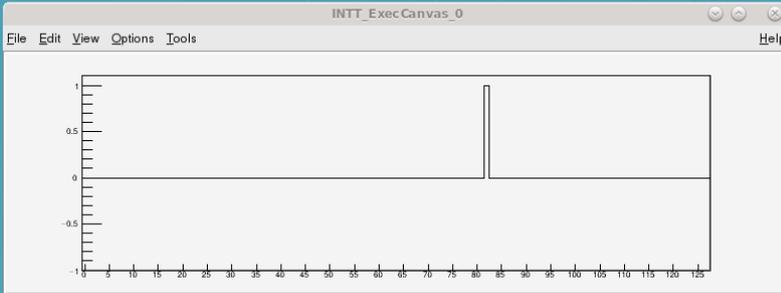
# INTT OnlMon Showcase

- In a separate ROOT session, ran a macro that:
  - Creates an instance of InttMonDraw
  - Initializes it and prepares the OnlMon framework
  - Draws the hitmap (InttMonDraw :: Draw("HitMap"))
- Checked the AutoExec functionality
- Checked the hit locations retrieved by InttMonDraw matched those chose by InttMon

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root [0]
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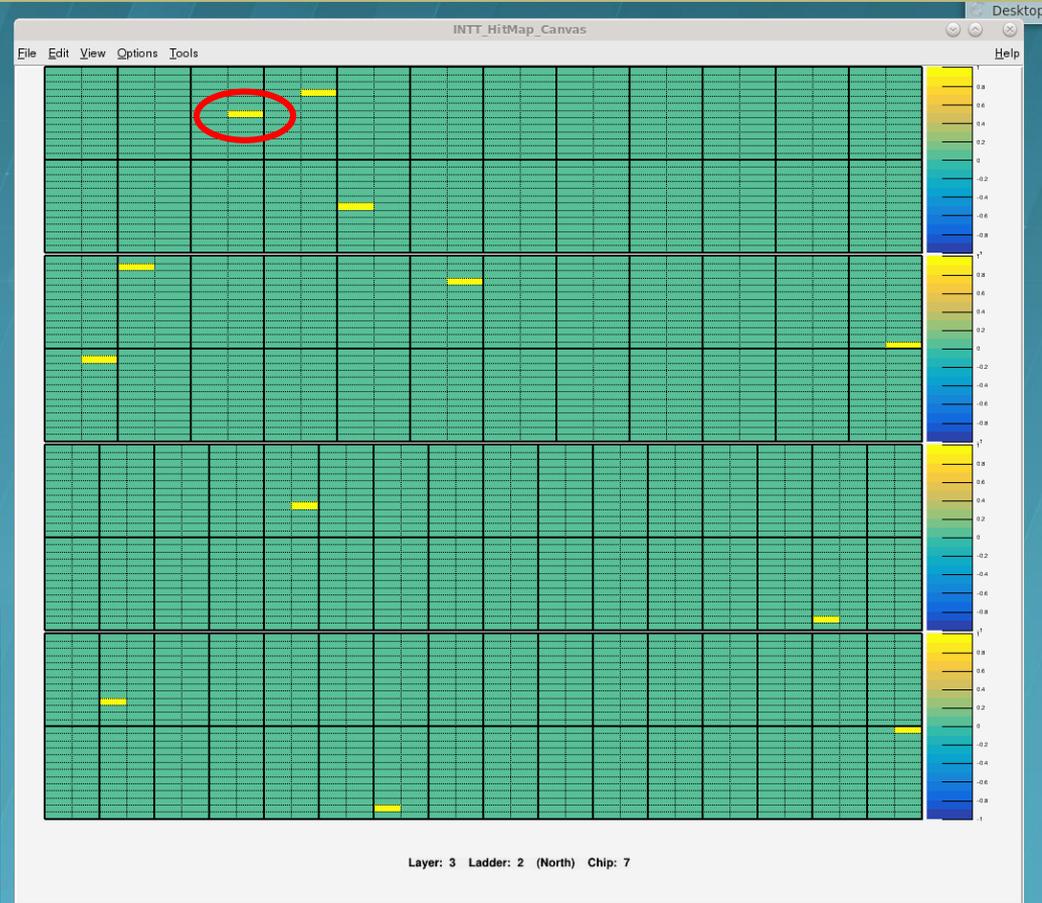
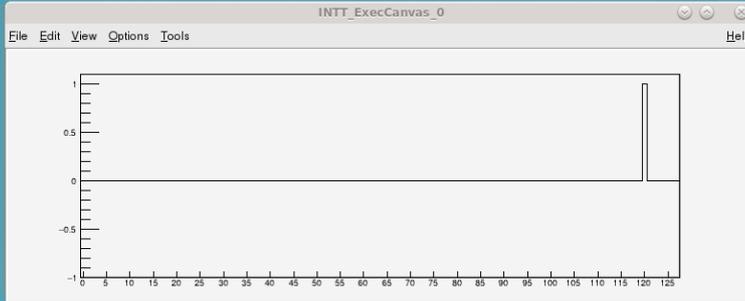
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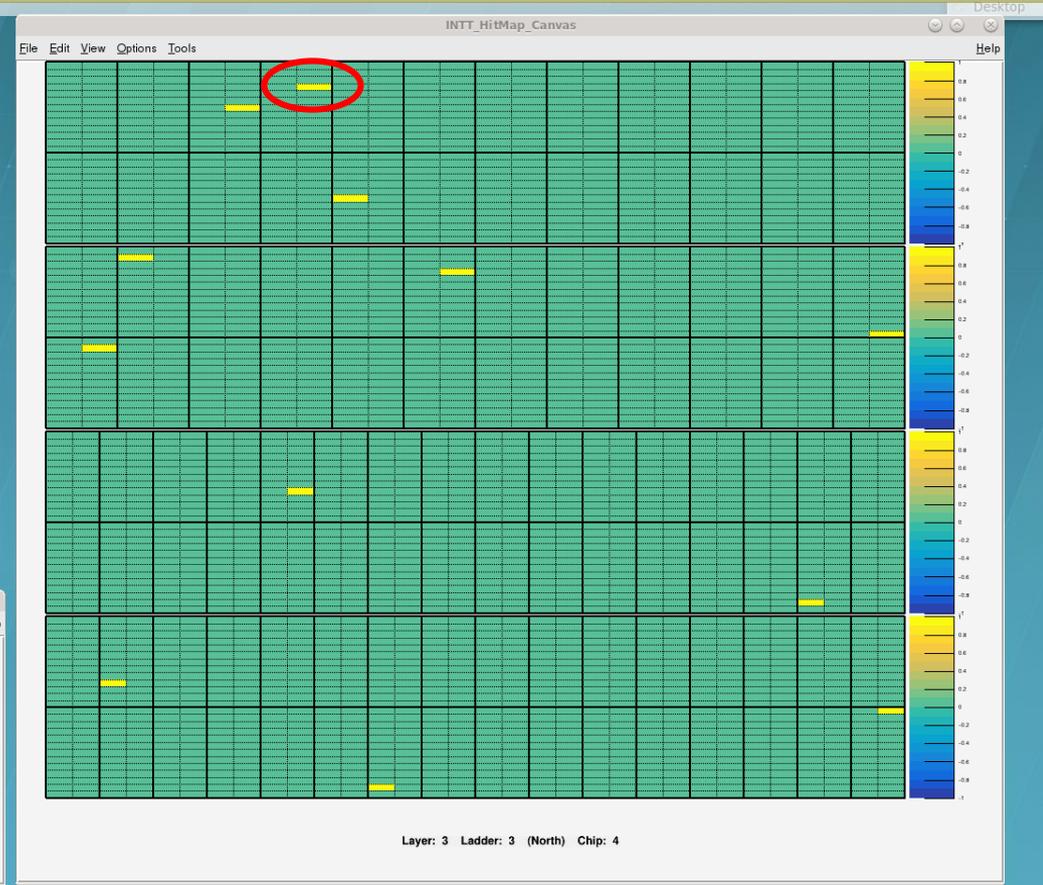
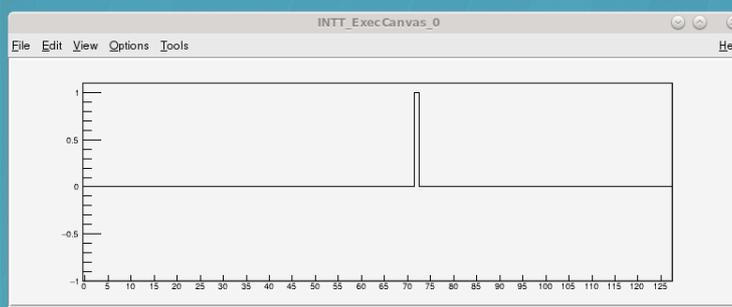
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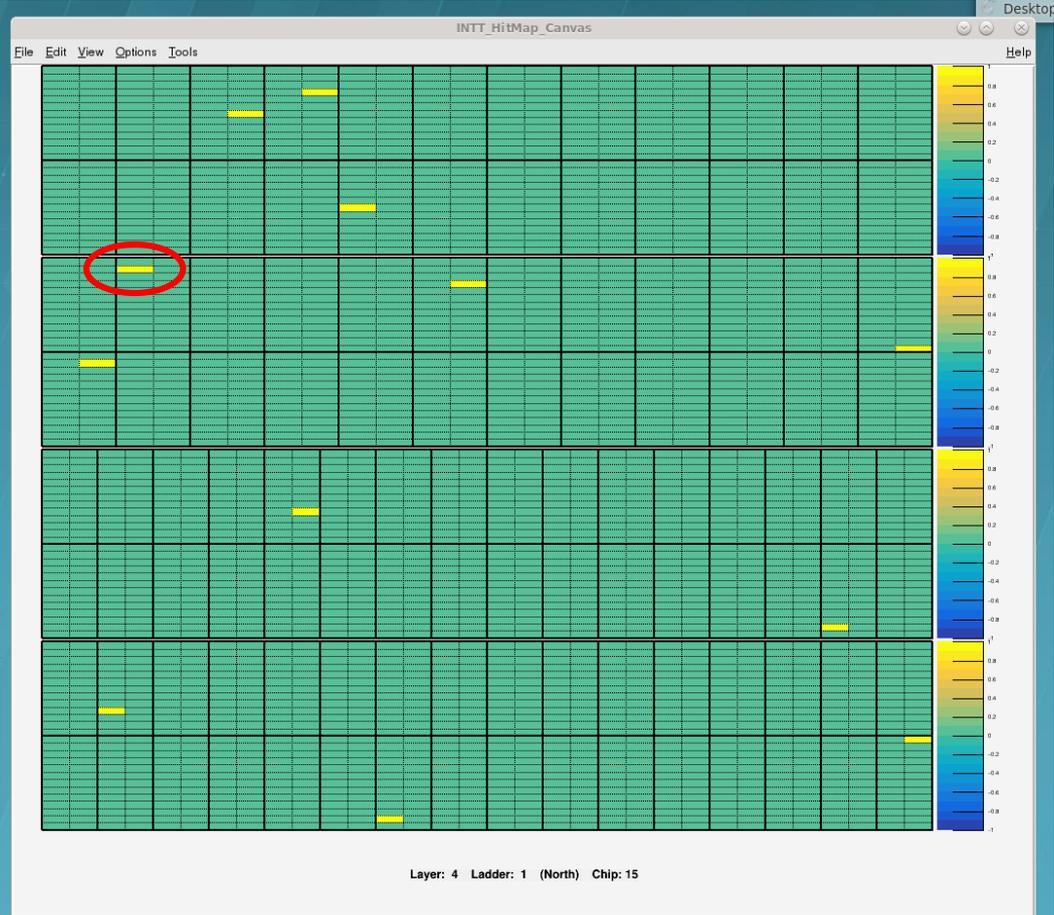
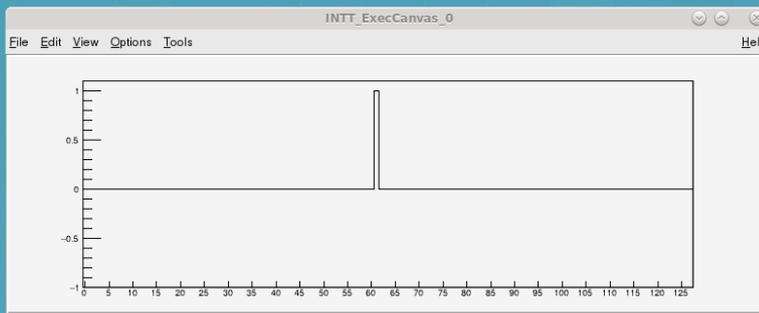
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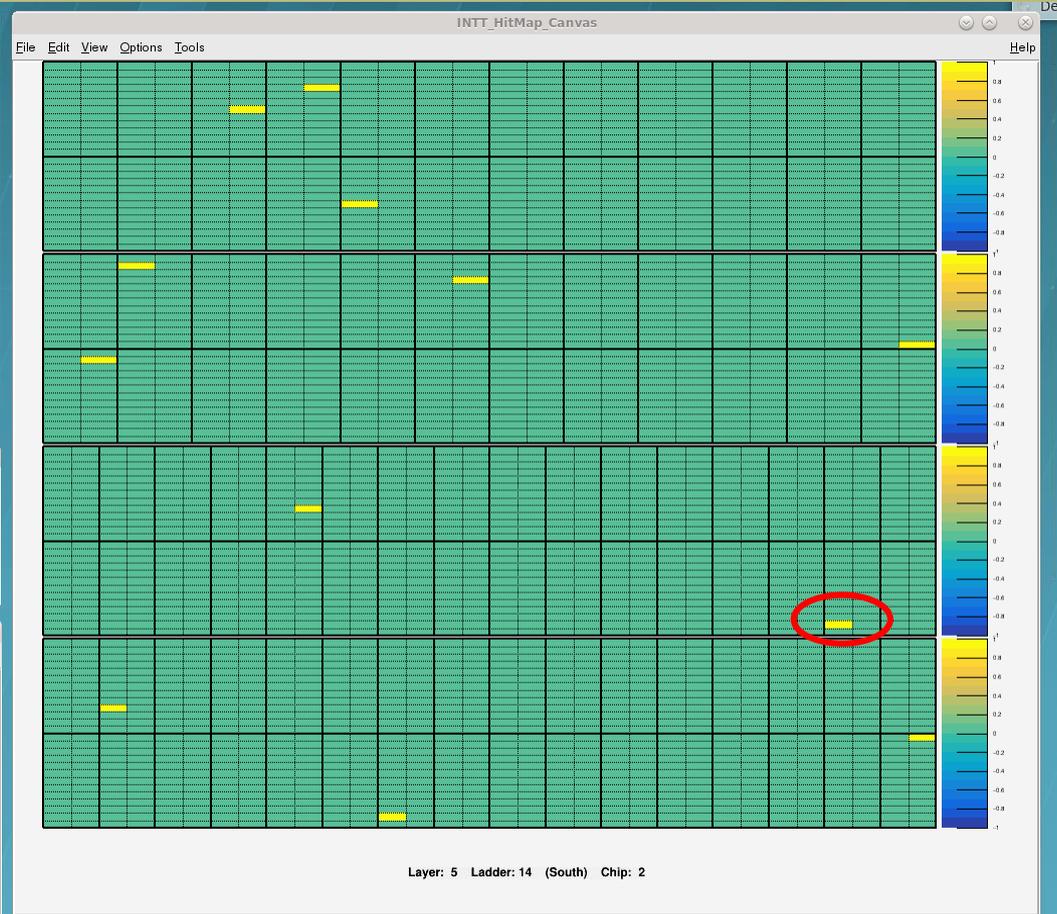
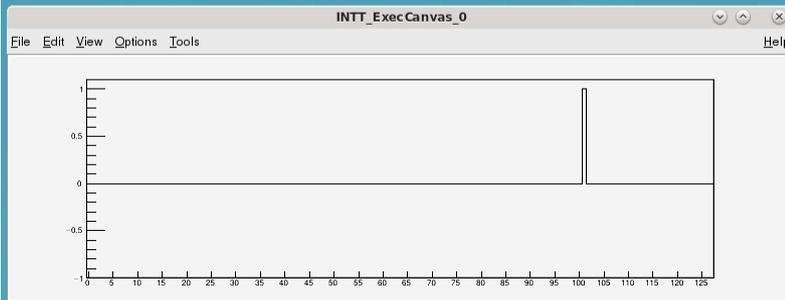
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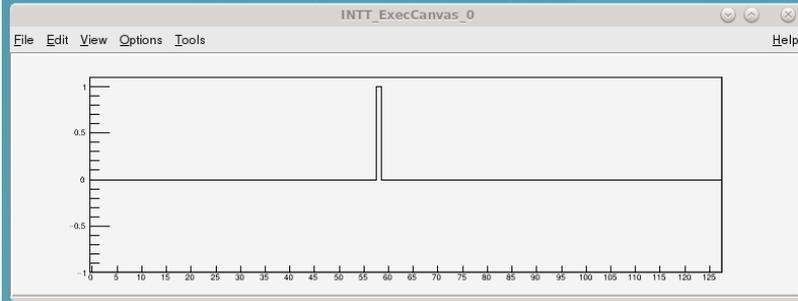
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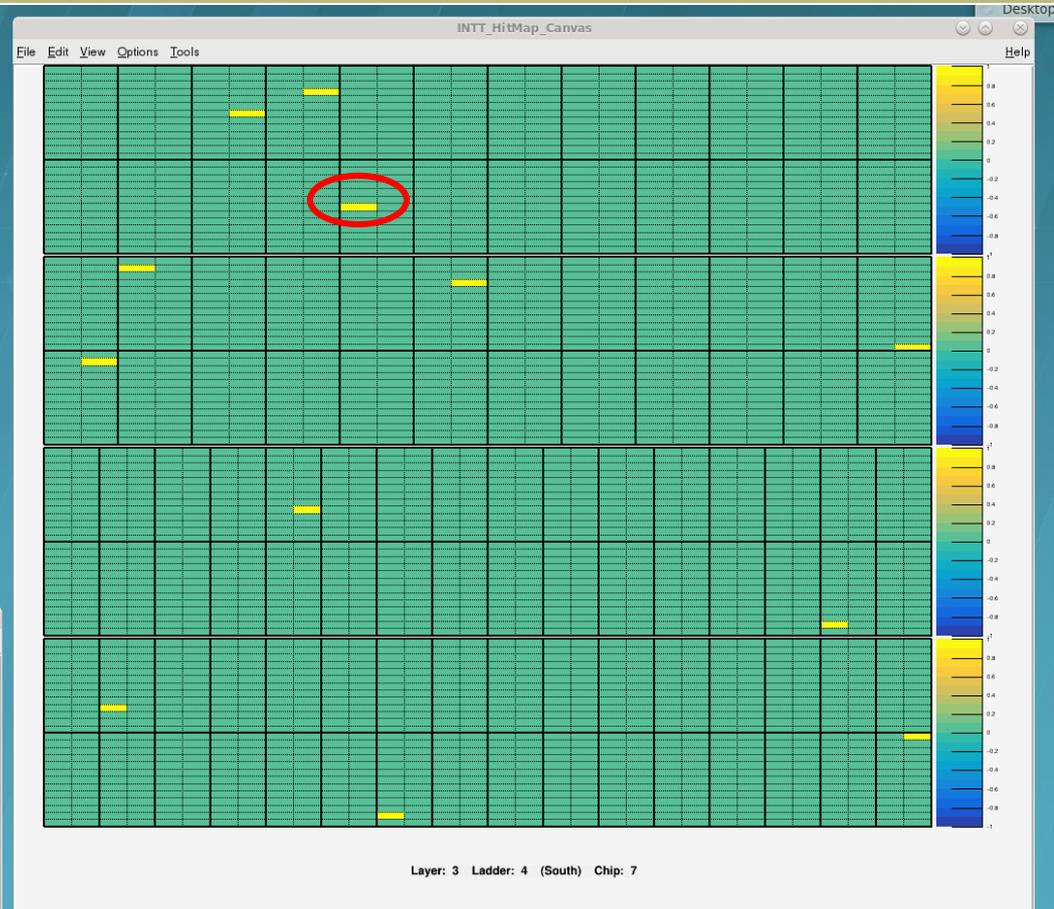
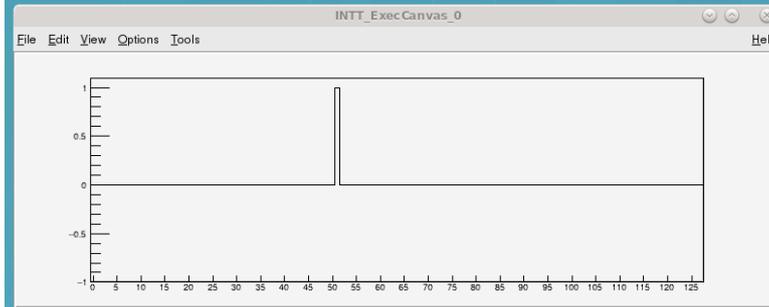
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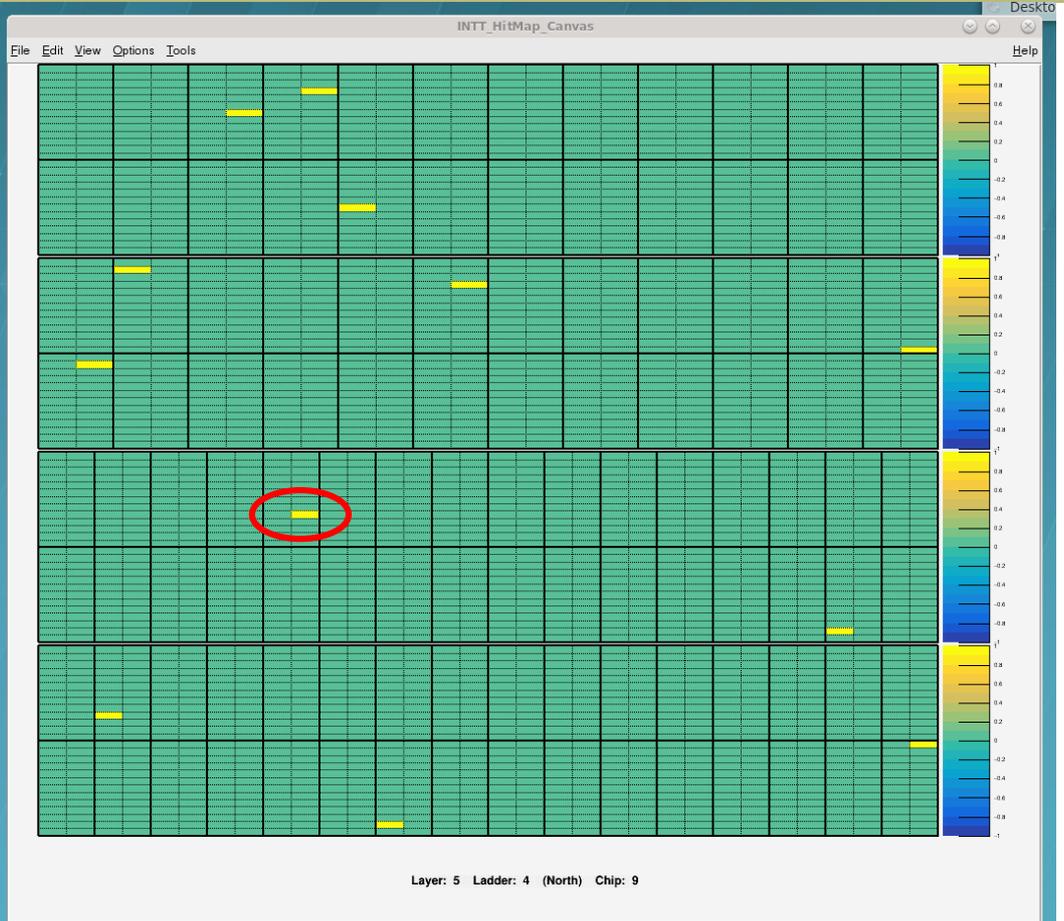
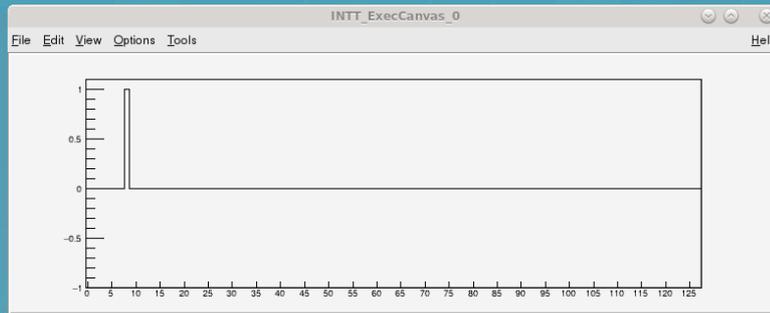
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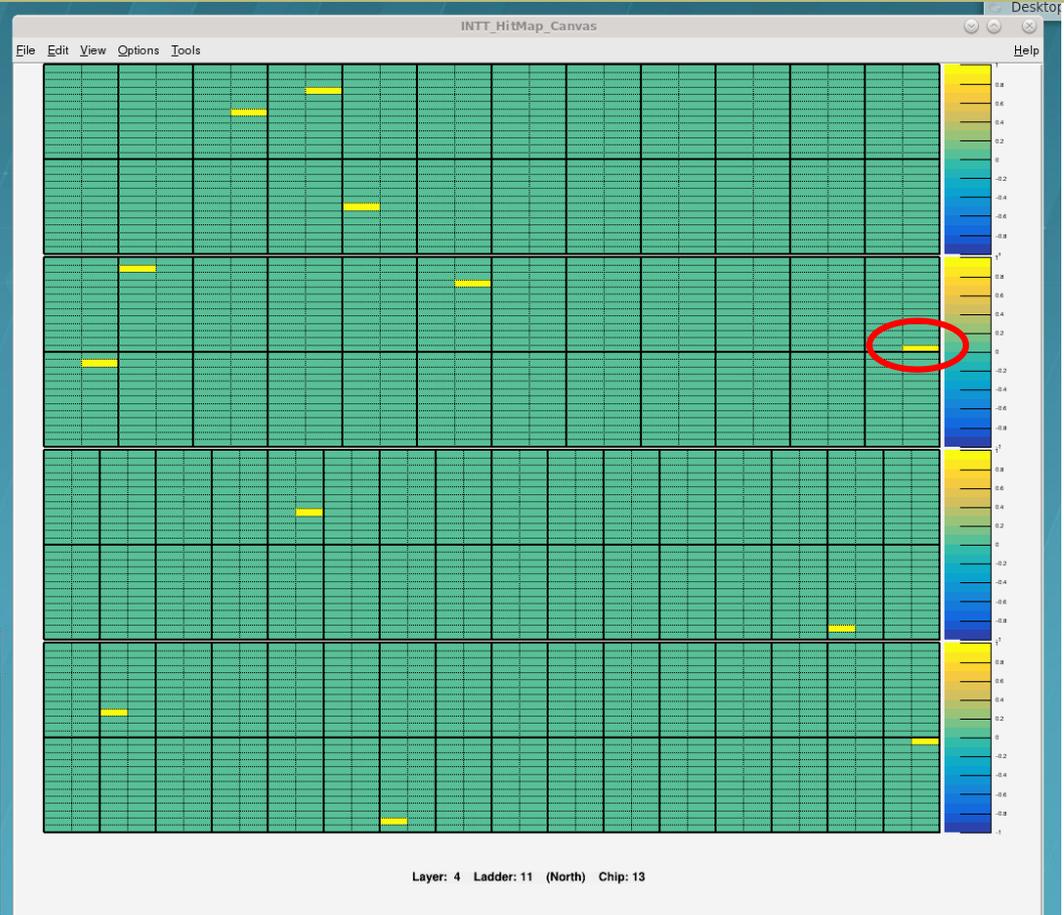
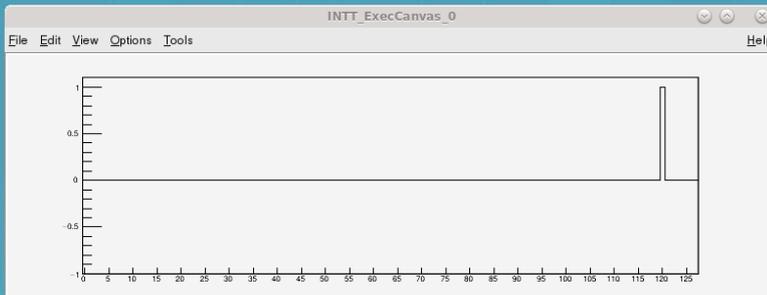
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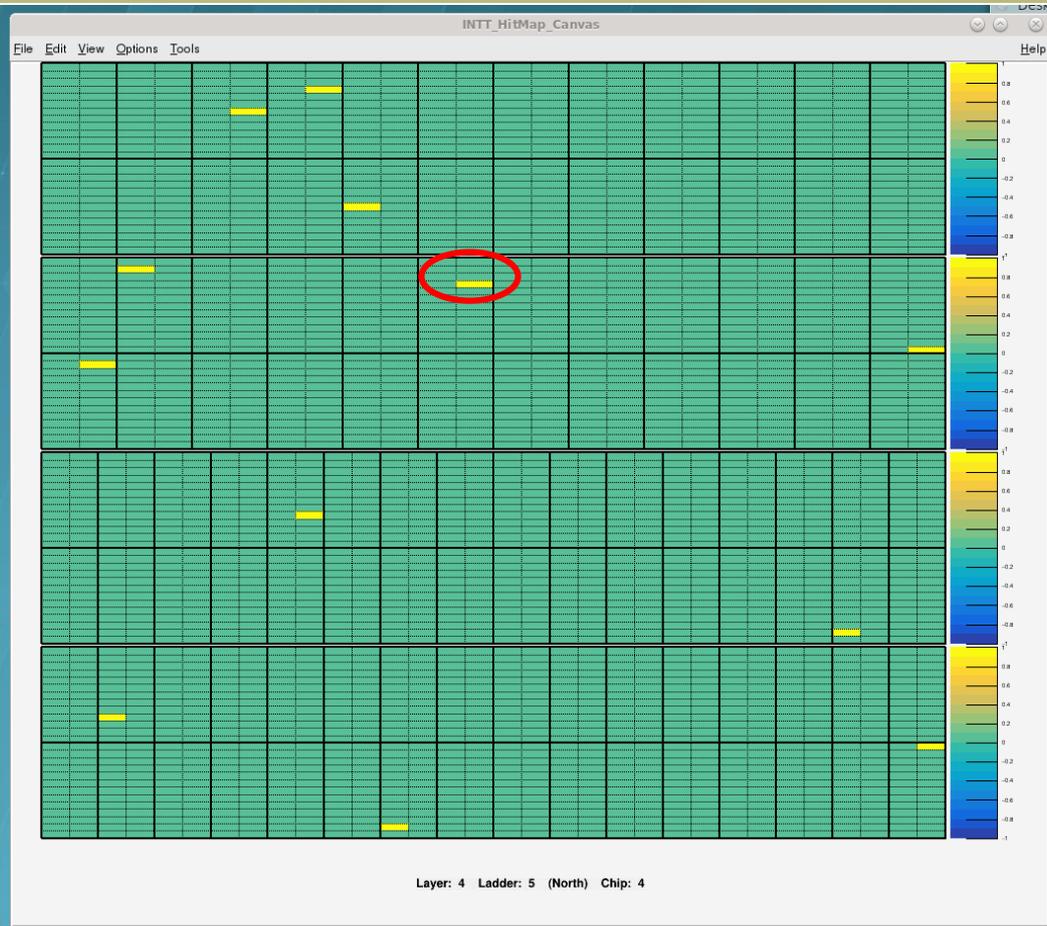
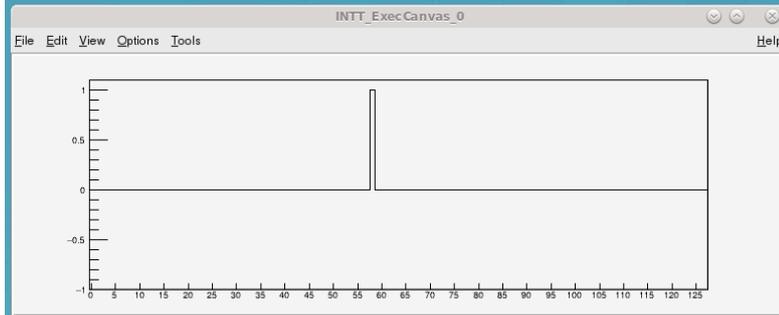
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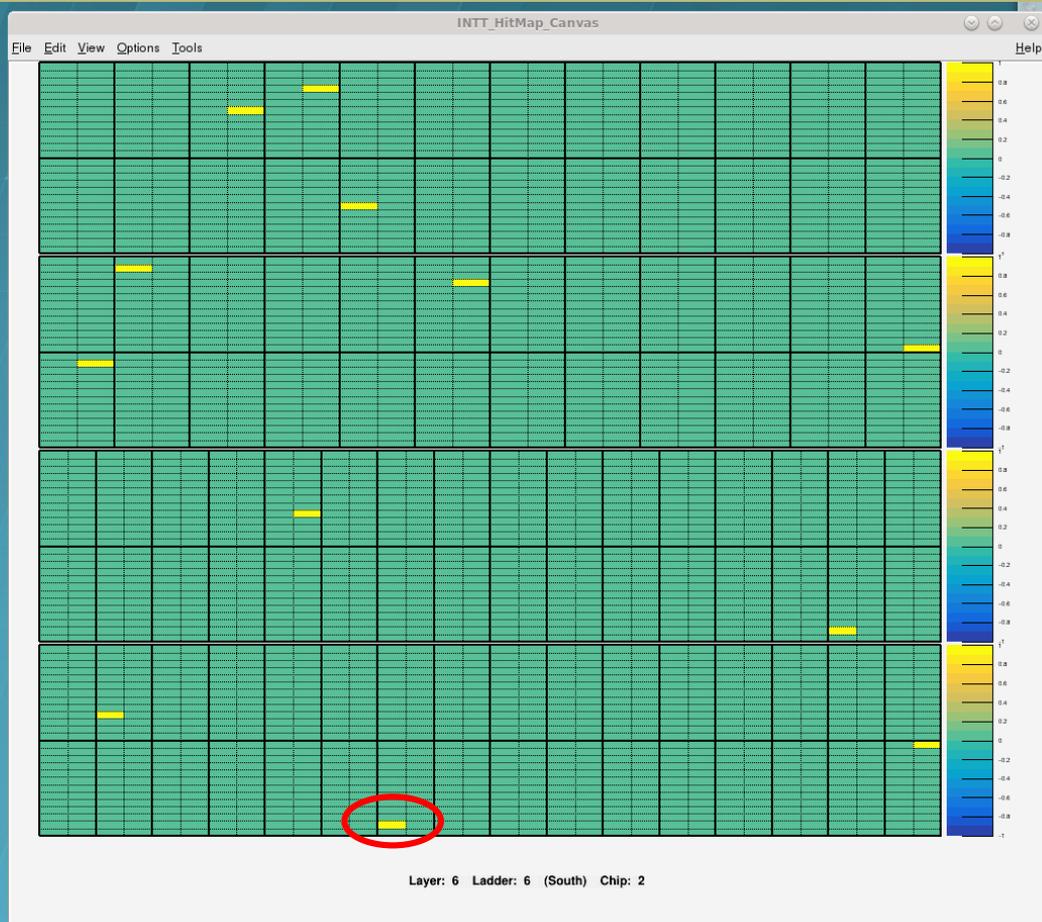
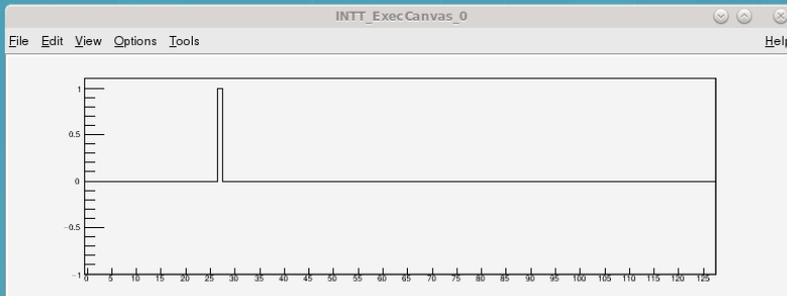
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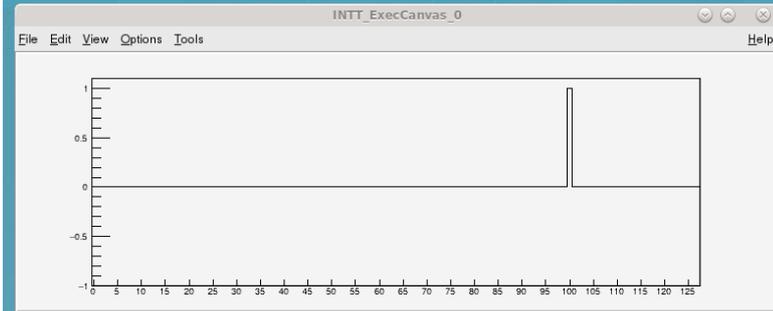
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# Future OnlMon Tasks

- Reorganize global constants in an InttMonConstants.h header into a class to avoid conflict with other subsystems implementations (no current conflicts)
- Address issues when redrawing histograms
  - Make sure the channel histogram, pad, and canvas actually update with mouse click
- Fine-tune drawing methods and aesthetic choices
  - Custom TStyle is not applied until AutoExec function is called
  - Add more detail to the pop-up

# Future OnlMon Tasks

- Implement unpacker when that becomes available, instead of random tasks
- Implement more drawing methods beyond HitMap(Z) and ADC(Z)
  - I use "Z" to indicate the histogram will be drawn based on the Z score of each chip, rather than a raw value
  - These are the normalized versions which are designed to highlight problematic chips
  - This is also a reference to "Z" in the "COLZ" drawing option which is used