

# LhARA: Ionacoustic Meeting

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## Geant4 to k-Wave pipeline

Geant4 simulation produces a root file. Needs to be converted to Matlab for k-Wave.

Previous pipeline:

<code>root2Ascii.cpp</code>	Read root file and converts to ascii.
<code>create-power-file-protononly.py</code>	Read ascii file, bins data into voxels, saves as binary file.
<code>save_data_in_matlab_format.ipynb</code>	Read binary file and converts to Matlab data format.

Currently:

<code>SP-MatMaker.sh</code>	Compile several converted C++ scripts, read root data, bin into voxels, and output Matlab file.
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If k-Wave can be run from C++ scripts, in theory the shell script can be modified to also run it after the conversion. Though I would imagine Matlab and k-Wave would also need to be installed on the lx machines.

## Missing features for converted files

- Doesn't produce plots
  - Is it needed?
- Just cartesian output
  - Could not find the script that produces cylindrical output
- Still need to verify produced Matlab file is correctly formatted.
- Output produces energy distributions integrated over time
  - Can be edited to produce power distribution as well as bin with time depending on needs.
- If desired Geant4 simulation could in principle skip writing to Root and just produce the Matlab binary file.