Lightning Talk

Using the Upgraded HGCAL LPGBTs to identify passive Wagons

Charlie Kapsiak

UMN

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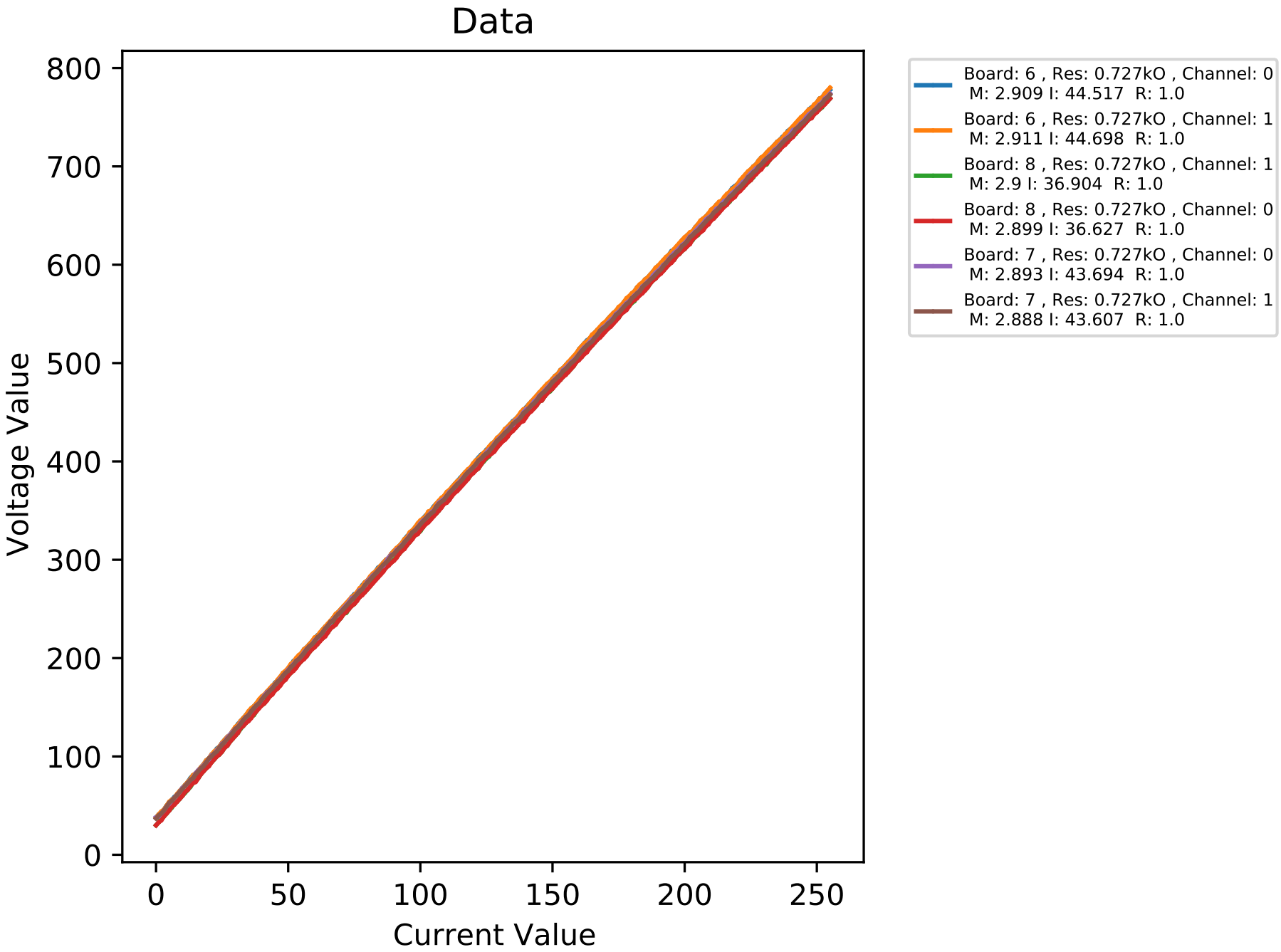
The Problem

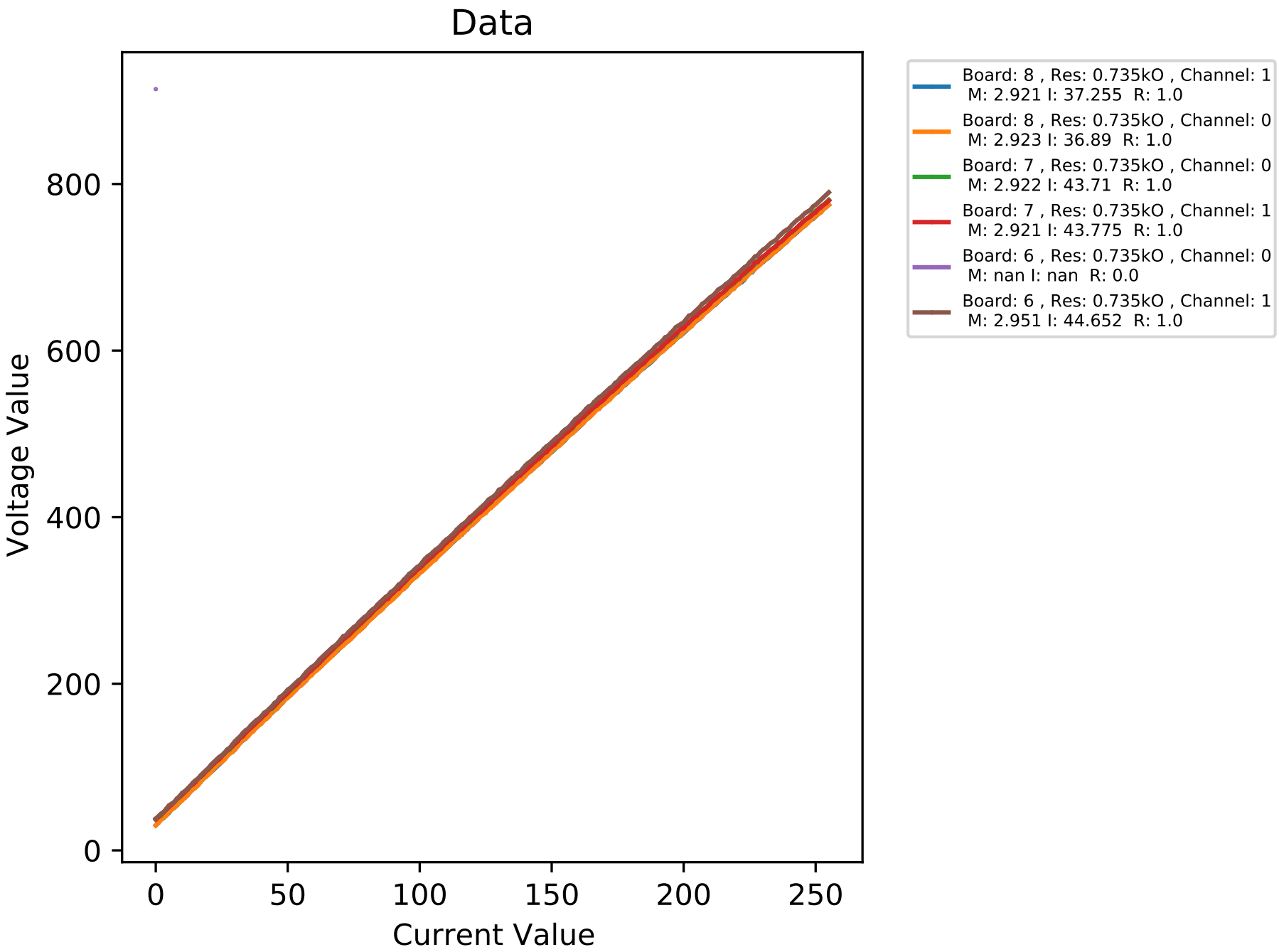
- The current Wagon design has been simplified to remove active components, which has advantages.
- This simplifies the design but makes it more difficult to identify the components while in the detector.
- Fortunately, the LPGBTs which form the key component ot the Engine have an impressive array of functionality, including a ADC, DAC, and constant current source.

Can we use a simple resistor measurement to identify the wagons once they are out of reach?

Using the LPGBTS to Identify Passive Wagons

- Began by expanding Binaya's framework for working with the ADC to include the DAC and constant source.
- Used this framework to conduct simple tests on a number of resistors to get a sense of the precision and consistency of the measurements. Hard to gauge accuracy because of missing calibration data.
- Promising results, indicate that the LPGBTS have impressive resolution.


Data
Voltage Value
Current Value
0
100
200
300
400
500
600
700
800
0
50
100
150
200
250
Board: 6 , Res: 0.727kO , Channel: 0
M: 2.909 I: 44.517 R: 1.0
Board: 6 , Res: 0.727kO , Channel: 1
M: 2.911 I: 44.698 R: 1.0
Board: 8 , Res: 0.727kO , Channel: 1
M: 2.9 I: 36.904 R: 1.0
Board: 8 , Res: 0.727kO , Channel: 0
M: 2.899 I: 36.627 R: 1.0
Board: 7 , Res: 0.727kO , Channel: 0
M: 2.893 I: 43.694 R: 1.0
Board: 7 , Res: 0.727kO , Channel: 1
M: 2.888 I: 43.607 R: 1.0


Data
Voltage Value
Current Value
0
200
400
600
800
0
50
100
150
200
250
Board: 8 , Res: 0.735kO , Channel: 1
M: 2.921 I: 37.255 R: 1.0
Board: 8 , Res: 0.735kO , Channel: 0
M: 2.923 I: 36.89 R: 1.0
Board: 7 , Res: 0.735kO , Channel: 0
M: 2.922 I: 43.71 R: 1.0
Board: 7 , Res: 0.735kO , Channel: 1
M: 2.921 I: 43.775 R: 1.0
Board: 6 , Res: 0.735kO , Channel: 0
M: nan I: nan R: 0.0
Board: 6 , Res: 0.735kO , Channel: 1
M: 2.951 I: 44.652 R: 1.0

Further Work

- One the calibrated engines arrive will be possible to exactly determine the actual ohmic resolution.
- Similarly once such boards arrive can experiment with the DAC range capabilities.

Thank you.