ContinueBack in qv3d

Instructions adapted from an email from John Farmer

ContinueBack works by separating the time scales for the witness and driver beams. In AWAKE the driver beam has a timescale ~1000 times longer than the witness. First, we simulate the driver beam without any witness and with a large timestep, then feed the results from that run into a simulation of just the witness beam.

Work out time steps for driver and witness beam (we used 10 for witness beam and 10000 for driver), put these in the input deck

# Driver simulation

In Domain add 2 lines:

SaveBackFlag = 1  
RearPosition = 101 (change this to where you want the save to be, we chose 5.5 as it has to be between where the witness bunch would be and the proton bunch)

Run this and you should have 2 files: v3d\_ContinueBackBeams\_PE2d\_X.h5 &  
 v3d\_ContinueBackFields\_PE2d\_X.h5

# Witness Simulation

Create a directory where you will run the witness simulation. This simulation will look for the ContinueBack files in the current directory, so create "soft links" to avoid copying a lot of data. (To do a soft link to the files in a given directory type ln –s dir/of/files/\*)

In the witness input deck set SaveBackFlag to 0 and set RearPosition to a negative number.  
To tell the code that it needs to lead the ContinueBack data, in Controls, add the line  
 ContinueBack = 1

Since this simulation window starts where the base simulation saved its data and moves backwards, you should shorten the window length. Xlength of the continuation run will typically be the same as RearPosition in the base run. To make life hard, rounding here is done the other way, so if RearPosition was 6.11 you might use 6.09 here.  
  
This should work!