

BornAgain - Documentation #330

Core: beam propagation: take care of $kz=0$ case appropriately

17 Jul 2013 11:19 - herck

Status:	In Progress	Start date:	17 Jul 2013
Priority:	Normal	Due date:	
Assignee:	rbeerwerth	% Done:	0%
Category:		Estimated time:	0.00 hour
Target version:	v1.18		

Description

Right now, when kz is exactly zero inside a layer, a possible linear amplitude profile is not taken care of. Instead, the following happens:

- $kz=0$ in the top layer of a multilayer sample with more than one layer: this means zero glancing angle and we take $T_0=1$ and $R_0=-1$ (as this represents the correct limit). All boundary conditions at the interfaces are put to zero;
- $kz=0$ in the only layer: in this case, we only have Born approximation and $T=1$ and $R=0$;
- $kz=0$ in a layer, other than the top layer of a multilayer sample: while the correct boundary conditions will be calculated, the used profile is a constant one and T =boundary value of wavefunction and $R=0$.

History

#1 - 20 Jan 2014 12:16 - wuttke

- Description updated

#2 - 04 Jun 2014 13:17 - herck

- Target version set to Sprint 22

#3 - 04 Jun 2014 15:39 - herck

- Status changed from Backlog to Sprint

#4 - 26 Jun 2014 12:32 - herck

The real problem does not reside in calculating the layer coefficients (amplitudes of R and T) but in the fact that included particles in the layer no longer scatter according to the Fourier transform of the shape function (there is no longer an exponential wave inside the layer but a linearly decreasing one).

#5 - 30 Jul 2014 17:21 - pospelov

- Status changed from Sprint to Backlog

#6 - 30 Jul 2014 17:21 - pospelov

- Target version deleted (Sprint 22)

#7 - 17 Feb 2015 10:39 - wuttke

- Parent task set to #966

#8 - 20 Feb 2015 11:53 - wuttke

- Parent task changed from #966 to #983

#9 - 22 Apr 2015 13:14 - herck

- Tracker changed from Feature to Documentation

#10 - 02 Jun 2015 21:59 - wuttke

- Status changed from Backlog to Sprint
- Assignee set to wuttke
- Priority changed from Normal to High
- Target version set to Sprint 27

#11 - 09 Jun 2015 17:06 - herck

- Target version changed from Sprint 27 to Sprint 28

#12 - 12 Jun 2015 17:55 - wuttke

- Status changed from Sprint to Backlog
- Priority changed from High to Normal
- Target version deleted (Sprint 28)
- Parent task changed from #983 to #1102

For small glancing angles, it is necessary to carefully consider the effects of finite beam width, finite sample extension, and multiple scattering ([#1102](#)). Only if this is properly resolved it will make sense to come back to the very special, practically unimportant case $f=0$.

#13 - 02 Jun 2016 19:10 - wuttke

- Assignee deleted (wuttke)

no hope that I'll be free for this any soon

#14 - 18 Sep 2020 17:23 - wuttke

- Subject changed from Take care of $kz=0$ case appropriately to Core: Take care of $kz=0$ case appropriately
- Status changed from Backlog to In Progress
- Assignee set to rbeerwerth
- Target version set to v1.18
- Parent task deleted (#1102)

Not primarily a documentation problem.

The case $kz=0$ is unphysical because there is always some absorption - except in vacuum.

#15 - 19 Sep 2020 10:12 - wuttke

- Subject changed from Core: Take care of $kz=0$ case appropriately to Core: beam propagation: take care of $kz=0$ case appropriately