

GammaLib - Bug #3279

Broken power law flux is zero for energy boundary at break energy

07/21/2020 11:44 PM - Knödlseider Jürgen

Status:	Closed	Start date:	07/21/2020
Priority:	Urgent	Due date:	
Assigned To:	Knödlseider Jürgen	% Done:	100%
Category:		Estimated time:	0.00 hour
Target version:	1.7.1		

Description

It turned out that for the model

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<source_library title="source library">
  <source name="GammaCygni" type="DiffuseSource" tscal="1">
    <spectrum type="BrokenPowerLaw">
      <parameter name="Prefactor" value="1.08949" error="0" scale="1e-15" min="1e-07" max="1000" free="1" />
      <parameter name="Index1" value="2.05" scale="-1" min="0" max="5" free="0" />
      <parameter name="Index2" value="2.79" error="0" scale="-1" min="0.01" max="1000" free="1" />
      <parameter name="BreakEnergy" value="1" scale="100000" min="0.01" max="1000" free="0" />
    </spectrum>
    <spatialModel type="DiffuseMap" file="gammacygni_map.fits">
      <parameter name="Normalization" value="1" scale="1" min="0.001" max="1000" free="0" />
    </spatialModel>
  </source>
</source_library>
```

the flux is zero when the break energy and the energy boundary are identical:

```
>>> print(m[0].spectral().flux(gammalib.GEnergy(0.1,'TeV'),gammalib.GEnergy(100.0,'TeV')))
0.0
>>> print(m[0].spectral().flux(gammalib.GEnergy(0.09,'TeV'),gammalib.GEnergy(100.0,'TeV')))
7.30030511938e-11
>>> print(m[0].spectral().flux(gammalib.GEnergy(0.0999,'TeV'),gammalib.GEnergy(100.0,'TeV')))
6.09741642757e-11
>>> print(m[0].spectral().flux(gammalib.GEnergy(0.11,'TeV'),gammalib.GEnergy(100.0,'TeV')))
5.13186370633e-11
>>> print(m[0].spectral().flux(gammalib.GEnergy(0.10,'TeV'),gammalib.GEnergy(100.0,'TeV')))
0.0
```

History

#1 - 07/21/2020 11:47 PM - Knödlseider Jürgen

- Status changed from New to In Progress

Same is true for the energy flux.

#2 - 07/22/2020 12:08 AM - Knödlseider Jürgen

- Status changed from In Progress to Pull request

- % Done changed from 0 to 100

The problem occurred during an incomplete coverage of all possible cases. This was fixed now.

#3 - 07/22/2020 08:51 AM - Knödseder Jürgen

- *Status changed from Pull request to Closed*