# GammaLib - Bug #1128

## 2D PSF seems not to work properly for simulated events

02/04/2014 11:20 AM - Knödlseder Jürgen

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|---|---|---|---|
| **Status:** | Closed | **Start date:** | 02/04/2014 |
| **Priority:** | Immediate | **Due date:** | |
| **Assigned To:** | Knödlseder Jürgen | **% Done:** | 100% |
| **Category:** | | **Estimated time:** | 0.00 hour |
| **Target version:** | 00-08-01 | | |

**Description**

Christian Farnier noted that the attachment:irf_test.fits IRF file does not lead to a spread of Crab photons as expected from the point spread function.

### History

**#1 - 02/04/2014 11:21 AM - Knödlseder Jürgen**

*- Status changed from New to Feedback*

*- % Done changed from 0 to 100*

It turned out that the GCTAPsf2D::mc method did not take into account the special case that the sigma and/or normalization of the second and third Gaussian components are zero. The following code solves this issue

```
double GCTAPsf2D::mc(GRan&         ran,
                     const double& logE,
                     const double& theta,
                     const double& phi,
                     const double& zenith,
                     const double& azimuth,
                     const bool&   etrue) const
{
   // Update the parameter cache
   update(logE, theta);

   // Select in which Gaussian we are
   double sigma = m_sigma1;
   double sum1  = m_sigma1;
   double sum2  = m_sigma2 * m_norm2;
   double sum3  = m_sigma3 * m_norm3;
   double sum   = sum1 + sum2 + sum3;
   double u     = ran.uniform() * sum;
   if (sum2 > 0.0 && u >= sum2) {
      sigma = m_sigma3;
   }
   else if (sum1 > 0.0 && u >= sum1) {
      sigma = m_sigma2;
   }

   // Now draw from the selected Gaussian
   double delta = sigma * ran.chisq2();

   // Return PSF offset
   return delta;
}
```

**#2 - 02/06/2014 11:16 PM - Knödlseder Jürgen**

*- Status changed from Feedback to Closed*

### Files

| | | | |
|---|---|---|---|
| irf_test.fits | 39.4 KB | 02/04/2014 | Knödlseder Jürgen |