## First integral measurements for SLAC EPU, HU140

We have increased the number of terms in the polynomial fit. We have only done it at the lowest gap, as, at this gap, the integral fluctuations are the largest. At the larger gaps, the polynomial fits were adequate, in my opinion. We have also included the first derivative of the first integral, also at 13 mm gap. We have made the fit out to x<25 mm. If we fit only for x< 15 mm, the multipoles will change somewhat.

### HP 13 mm gap

 

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Multipole** | **Skew** | **Error** | **Normal** | **Error** |
| **2-pole (Gcm)** | -33.9 | 2.4 | 27.9 | 2.4 |
| **4-pole (G)** | 65.5 | 5.4 | -78.4 | 5.6 |
| **6-pole (G/cm)** | 10.7 | 10.8 | 93.3 | 11.1 |
| **8-pole (G/cm^2)** | -50.4 | 9.5 | 67.3 | 9.8 |
| **10-pole (G/cm^3)** | 5.4 | 12.5 | -59.5 | 12.9 |
| **12-pole (G/cm^4)** | 14.6 | 5.3 | -26.3 | 5.5 |
| **14-pole (G/cm^5)** | -2.6 | 5.5 | 13.6 | 5.7 |
| **16-pole (G/cm^6)** | -1.5 | 1.1 | 4.6 | 1.2 |
| **18-pole (G/cm^7)** | 0.6 | 1.0 | -1.2 | 1.1 |
| **20-pole (G/cm^8)** | 0.0 | 0.1 | -0.3 | 0.1 |
| **22-pole (G/cm^9)** | -0.0 | 0.1 | 0.0 | 0.1 |

### CP+ 13 mm gap

 

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Multipole | **Skew** | **Error** | **Normal** | **Error** |
| 2-pole (Gcm) | -10.3 | 1.7 | 51.4 | 2.3 |
| 4-pole (G) | 16.2 | 3.9 | -22.2 | 5.2 |
| 6-pole (G/cm) | 51.0 | 7.9 | 102.9 | 10.3 |
| 8-pole (G/cm^2) | -48.8 | 7.0 | 49.2 | 9.1 |
| 10-pole (G/cm^3) | -53.7 | 9.2 | -85.0 | 12.0 |
| 12-pole (G/cm^4) | 22.5 | 3.9 | -22.2 | 5.1 |
| 14-pole (G/cm^5) | 21.1 | 4.0 | 24.0 | 5.3 |
| 16-pole (G/cm^6) | -3.6 | 0.8 | 4.1 | 1.1 |
| 18-pole (G/cm^7) | -3.4 | 0.7 | -2.9 | 1.0 |
| 20-pole (G/cm^8) | 0.2 | 0.1 | -0.3 | 0.1 |
| 22-pole (G/cm^9) | 0.2 | 0.0 | 0.1 | 0.1 |

### CP- 13 mm gap



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Multipole** | **Skew** | **Error** | **Normal** | **Error** |
| **2-pole (Gcm)** | -8.8 | 3.6 | 104.2 | 2.0 |
| **4-pole (G)** | 12.1 | 8.2 | 14.4 | 4.6 |
| **6-pole (G/cm)** | -94.6 | 16.4 | -38.0 | 9.2 |
| **8-pole (G/cm^2)** | 9.3 | 14.5 | -0.0 | 8.2 |
| **10-pole (G/cm^3)** | 89.3 | 19.1 | 5.7 | 10.7 |
| **12-pole (G/cm^4)** | -8.8 | 8.1 | -1.0 | 4.6 |
| **14-pole (G/cm^5)** | -31.1 | 8.4 | -4.0 | 4.7 |
| **16-pole (G/cm^6)** | 2.5 | 1.7 | 0.4 | 1.0 |
| **18-pole (G/cm^7)** | 4.9 | 1.6 | 1.2 | 0.9 |
| **20-pole (G/cm^8)** | -0.2 | 0.1 | -0.1 | 0.1 |
| **22-pole (G/cm^9)** | -0.3 | 0.1 | -0.1 | 0.1 |

### VP 13 mm gap



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Multipole** | **Skew** | **Error** | **Normal** | **Error** |
| **2-pole (Gcm)** | -14.0 | 1.9 | 60.5 | 1.5 |
| **4-pole (G)** | -23.6 | 4.4 | 99.6 | 3.3 |
| **6-pole (G/cm)** | -12.6 | 8.8 | 44.1 | 6.6 |
| **8-pole (G/cm^2)** | -8.6 | 7.8 | -37.3 | 5.9 |
| **10-pole (G/cm^3)** | 7.7 | 10.3 | -42.6 | 7.7 |
| **12-pole (G/cm^4)** | 6.6 | 4.4 | 10.9 | 3.3 |
| **14-pole (G/cm^5)** | -0.9 | 4.5 | 10.1 | 3.4 |
| **16-pole (G/cm^6)** | -0.8 | 0.9 | -1.5 | 0.7 |
| **18-pole (G/cm^7)** | 0.1 | 0.8 | -0.8 | 0.6 |
| **20-pole (G/cm^8)** | 0.0 | 0.1 | 0.1 | 0.1 |
| **22-pole (G/cm^9)** | -0.0 | 0.1 | 0.0 | 0.0 |