

November 2015 HVCMOS Irradiation Campaign Report

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Introduction

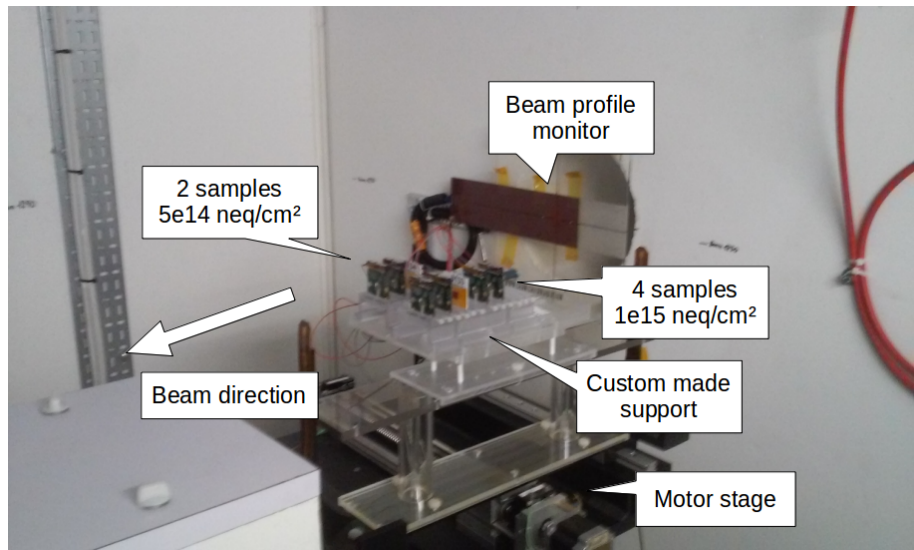
- Irradiation of six CHESS1 HVCMOS devices with 24 GeV protons at CERN PS IRRAD facility (IRRAD 9)
 - Four samples to be irradiated to a dosis of $1\text{e}15\text{ neq/cm}^2$
 - Two samples to be irradiated to a dosis of $5\text{e}14\text{ neq/cm}^2$
- Access dates:
 - Wednesday 4 November: installation
 - Wednesday 11 November: removal of samples
- 48 h total expected irradiation time
 - 32 hours for $1\text{e}15$ samples
 - 16 hours for $5\text{e}14$ samples
- Minimization of annealing time:
 - Delay the start to finish closer to the date of access
 - 48 h + 48 h safety margin – start Saturday

Avoid risks – last week of irradiation at the PS this year

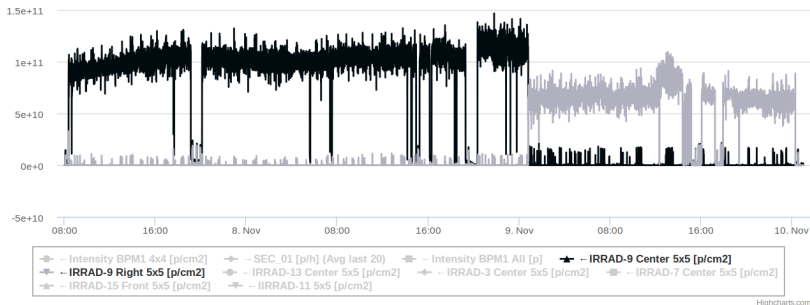
Setup at the Beam Line

- Each sensor mounted and wire bonded on a PCB card
- Two sets for two different doses placed parallel to the beam
- When required fluence on one set reached, move the second set into the beam by a positioning stage
- New PCB support built at Oxford – some adjustments required on site
- Devices powered during the entire process by 3.3 V DC
 - Total current before the start: 0.50 A
 - Total current after $1e15$ set irradiated: 0.41 A
 - Total current after both sets irradiated: 0.39 A

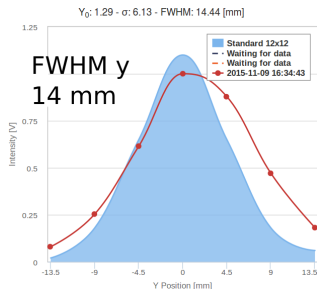
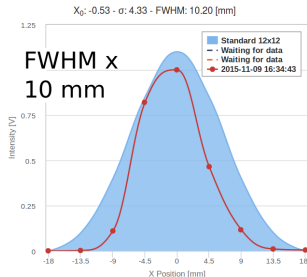
Setup at the Beam Line



Proton Beam Properties



Highcharts.com



Current Status

- $1\text{e}15 \text{ neq/cm}^2$ samples
 - Saturday 8 a.m. – Monday 1 a.m. (40 h beam time)
 - Sec counter (\propto fluence): required 160M, received 167M
- $5\text{e}14 \text{ neq/cm}^2$ samples
 - Monday 1 a.m. – Tuesday 1 a.m. (24 h beam time)
 - 4 mm position adjustment made after 12 hours, reverted after two hours
 - Sec counter: required 80M, received 82M
- Wednesday access
 - Fix PCBs individually in a sample box (suitable for shipment)
 - Place the box in a freezer immediately afterwards

