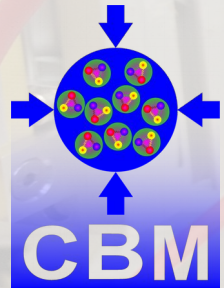
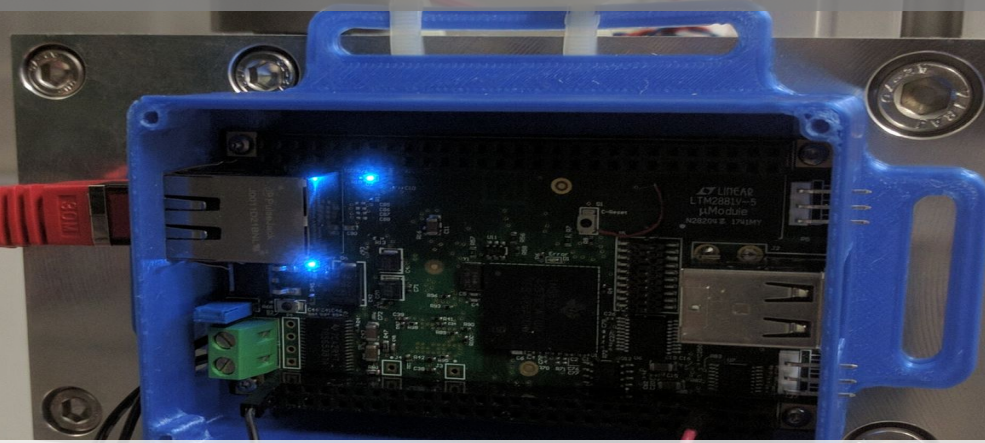


Fault Tolerant Local and Monitoring Control Board

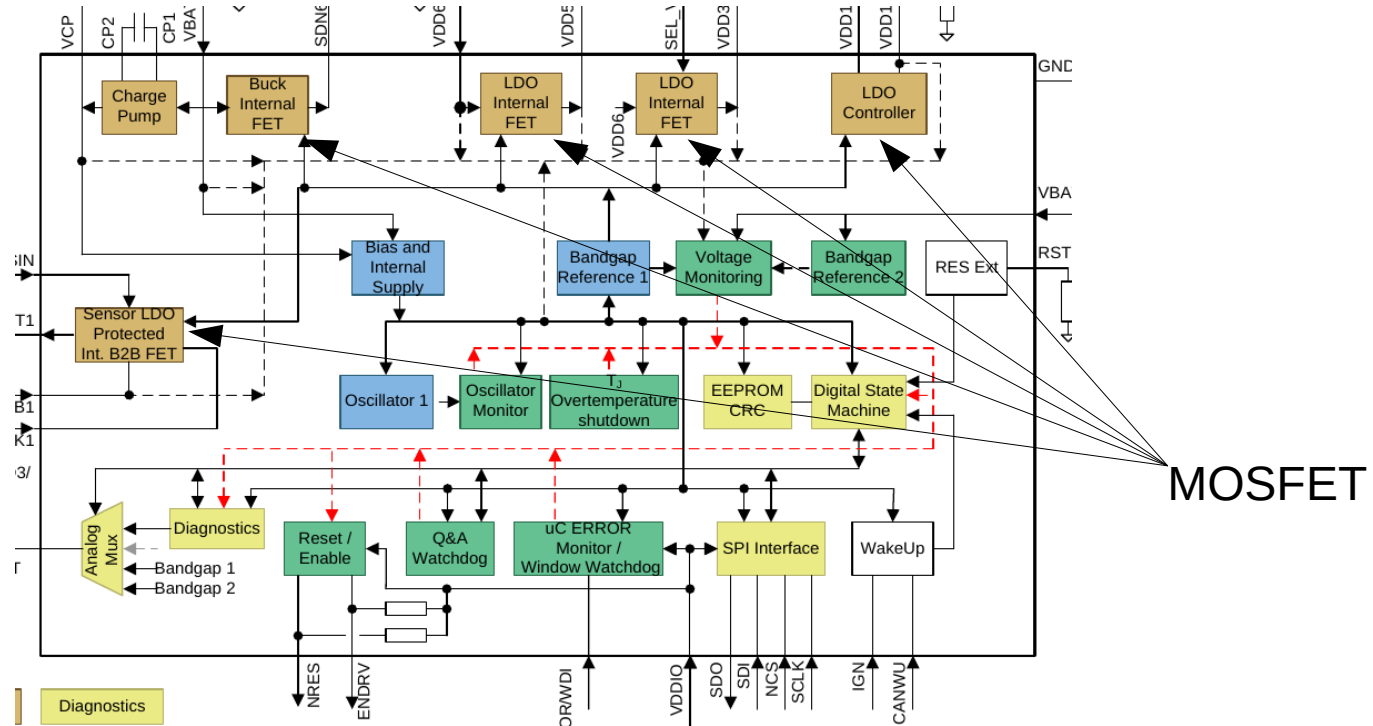


Research group Prof. Udo Kebschull
José Antonio Lucio Martínez

Infrastructure and Computer Systems in Data Processing
Goethe Universität Frankfurt

DC-DC Converter Radiation Issue

- Part used in FTLMC: TPS65381A-Q1



MOSFET TID Effects

- CBM Experiment collisions energy: $>10\text{GeV}/u$
- TID effects in MOS exacerbated by charge yield
- Heavy ions are the least effective in generating TID effects

Source: Texas Instruments
Radiation Handbook for Electronics
sgzy002a.pdf

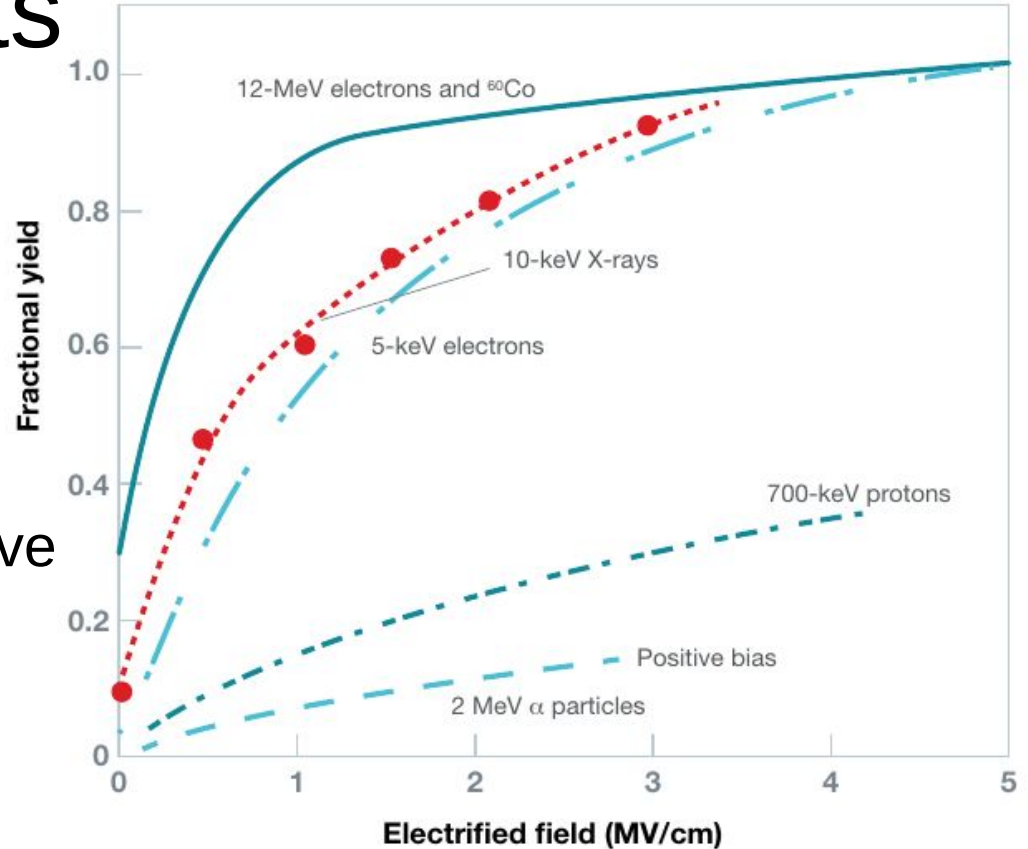
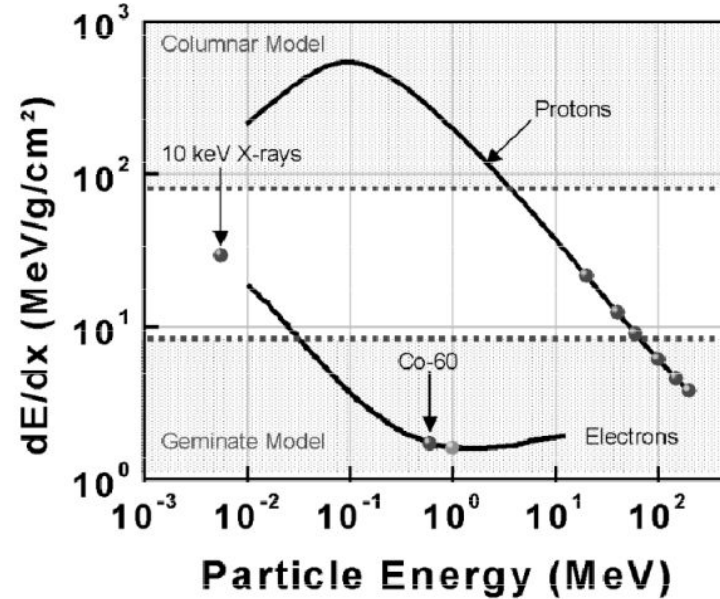
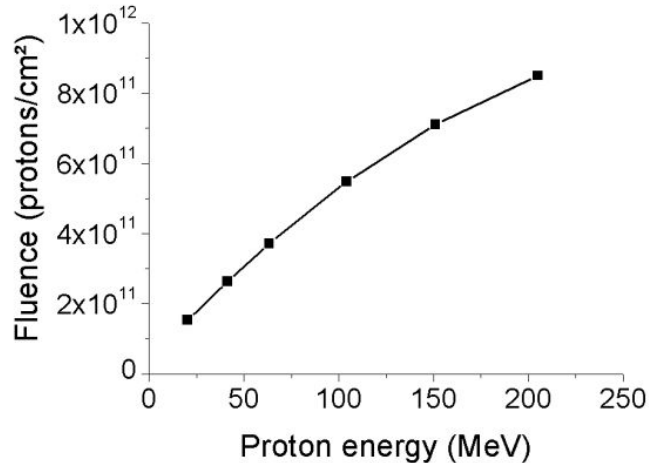


Figure 3-3. This diagram shows charge-yield fraction as a function of the oxide electric field for different types of ionizing radiation.^[1] Note that more highly charged particles have a lower fractional yield.

MOSFETS

- Linear Energy Transfer as Particle Energy function
- As Proton energy goes up, more fluence is needed to deposit a total dose of 50 krad(SiO_2)



Comparison of Charge Yield in MOS Devices for Different Radiation Sources P.Paillet et. al.

Components Database

- Information taken from mouser and digikey on 20.06
- Queries to check availability and component id in board
 - Example component id RC0402FR-0722RL

R15
R16
R4
R5
R68
R8
R87
R88
R89
R90
R91
R92
R93
R94
R95
R96

	Factory lead time	Immediate dispatch
CRCW06030000Z0EAC	19 Wochen	810730
MCT06030C3900FP500	16 Wochen	8604
CRCW0603220RFKEB	13 Wochen	19400
RCA0603100KJNEC	13 Wochen	20183
J0011D21BNL	9 Wochen	2296
B3U-1000P	15 Wochen	61104
TMS570LC4357	11 Wochen	2589
DP83640TVV/NOPB	2 Wochen	2594
SN65HVDA1040AQDRQ1	2 wochen	6872
TPS65381A-Q1	18 Wochen	7429
DS2484	13 Wochen	31220
REF02AU	2 Wochen	801
7A-16.000MAAJ-T	11 Wochen	18264
ASV-50.000MHZ-E-T	9 Wochen	1279
ADUM3482BRSZ	9 Wochen	255

Components Database

- Information of some of the important parts

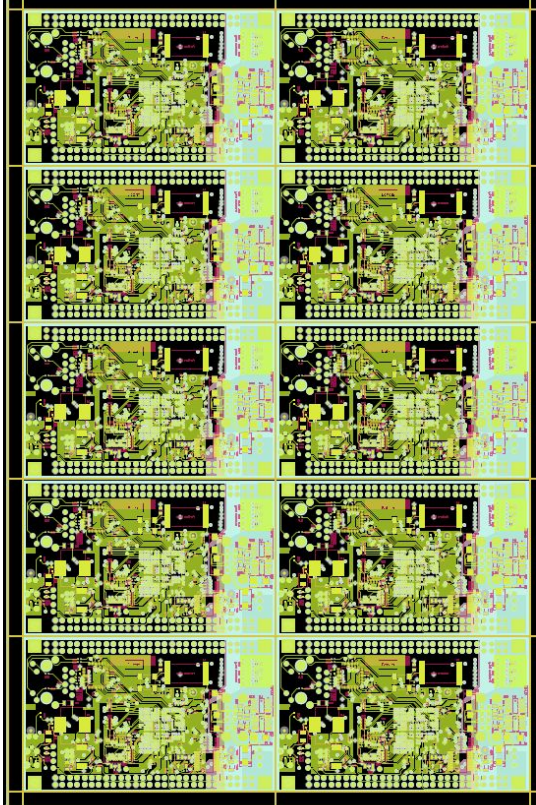
part	beschaffungszt	numav	provider
SML-P12U2TT86R	10 Wochen	8136	Mouser
SML-LX0402USBC-TR	12 Wochen	1920	Mouser
MBRS340T3	4 Wochen	102843	Mouser
SMBJ30CA-13-F	10 Wochen	15944	Mouser
NVR5124PL	5 Wochen	79864	Mouser
FDD8444	4 Wochen	26572	Mouser
TMS570LC4357	11 Wochen	2589	Mouser
DP83640TVV/NOPB	2 Wochen	2594	Mouser
SN65HVDA1040AQRQ1	2 wochen	6872	Mouser
TPS65381A-Q1	18 Wochen	7429	Mouser
DS2484	13 Wochen	31220	Mouser
REF02AU	2 Wochen	801	Mouser
ADUM3482BRSZ	9 Wochen	255	Digikey
TRSF3232ECPWR	12 Wochen	457	Digikey
LTM2881IV-5#PBF-ND	8 Wochen	866	Digikey

Docker Script

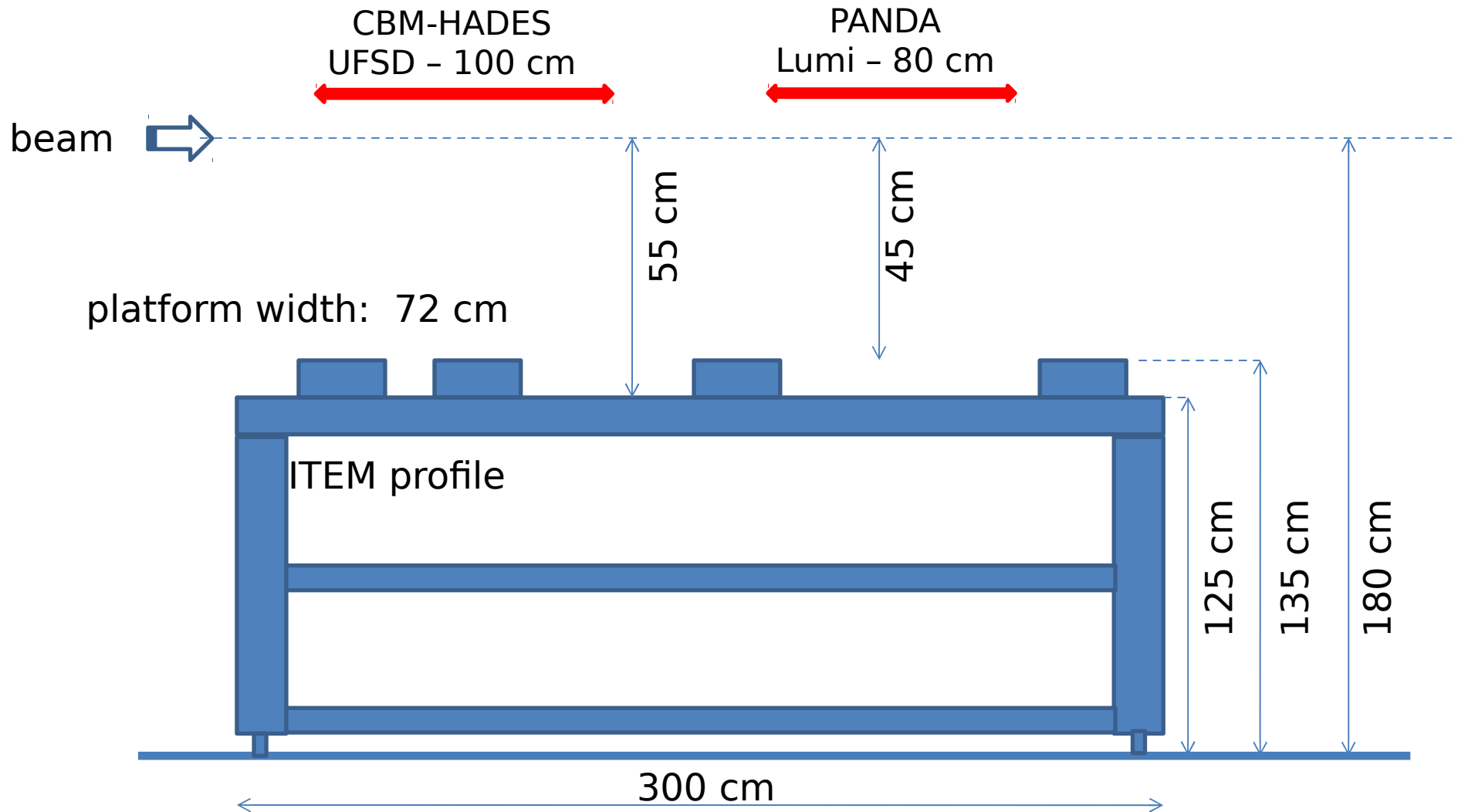
- RTEMS Cross compiling tools
- RTEMS FTLMC configuration and installation
- EPICS and its patches for RTEMS 4.11 included
- Multiplatform support to create flmc binaries



PCB Status

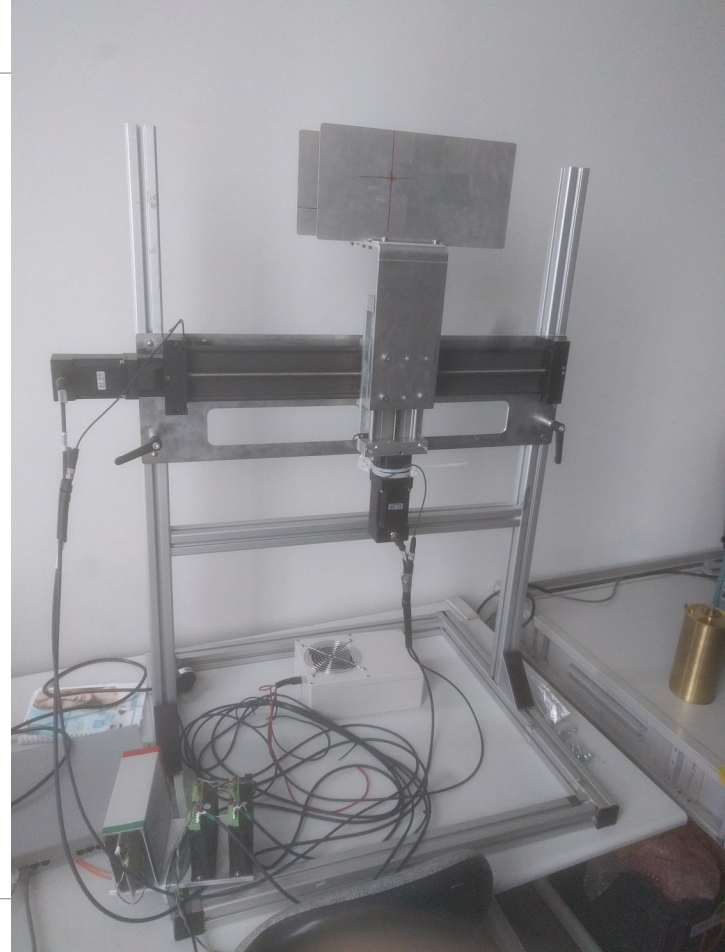


- Order requested 28 June
- Materials delivered to manufacturer
- 8 Weeks as deliver time
- Will be delivered to GSI
- We would then borrow to make tests and install firmware



Beam-time

- Motorized frame used
 - Can be used also as use case demonstration
- Logistics need to be defined
- Usage time to be defined
- Tentative date, Week 37



Thank you!

