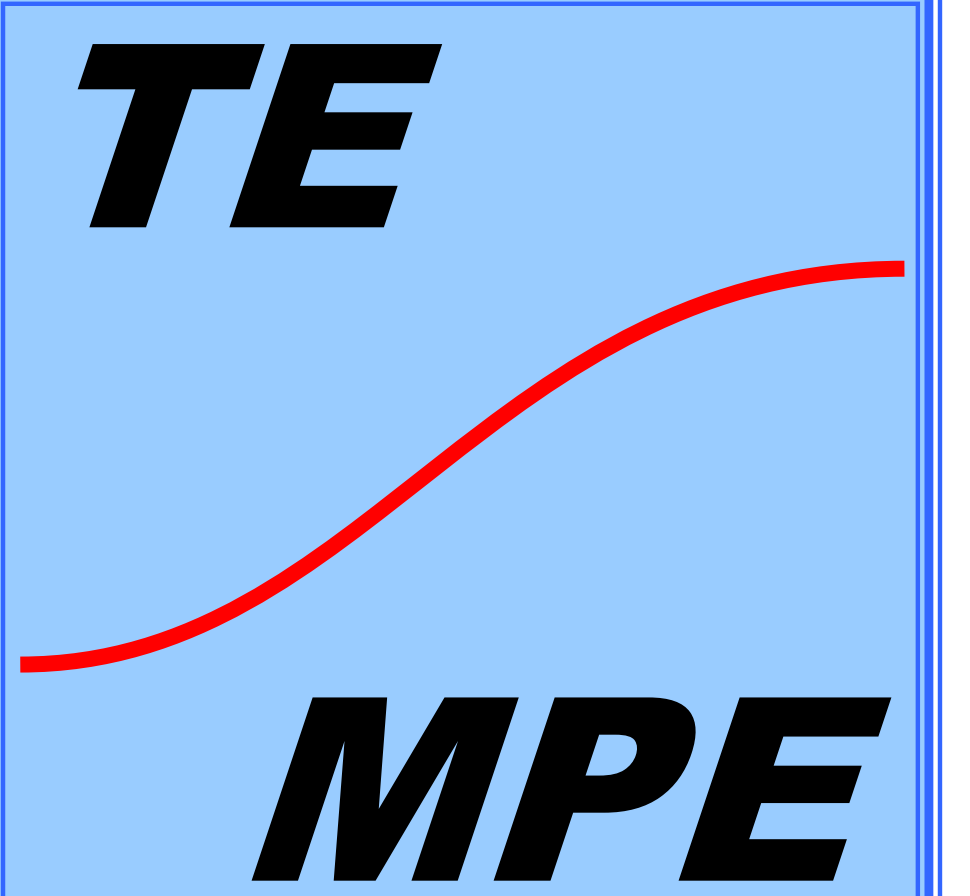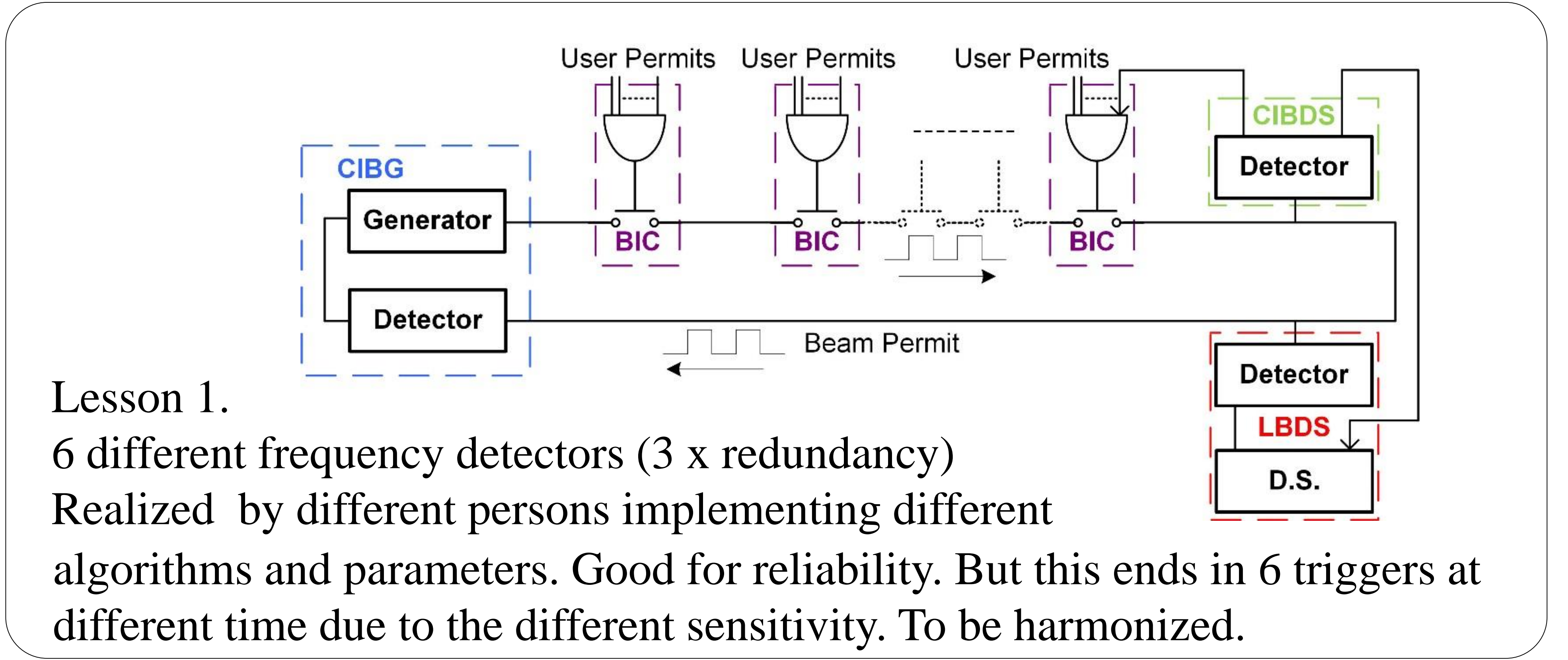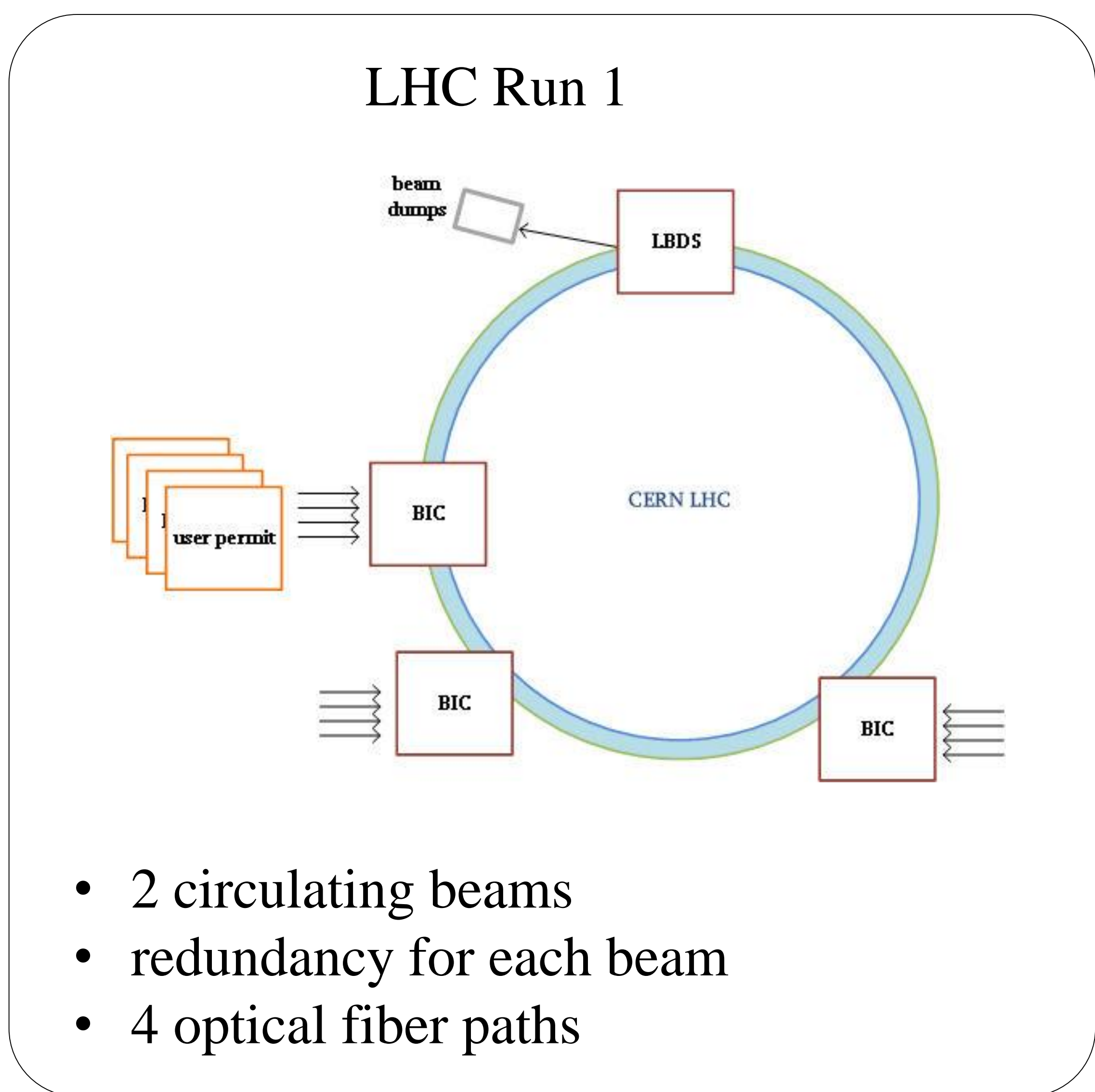# CERN Beam Interlock Redundant Dump Trigger Module Performance During LHC Run 2

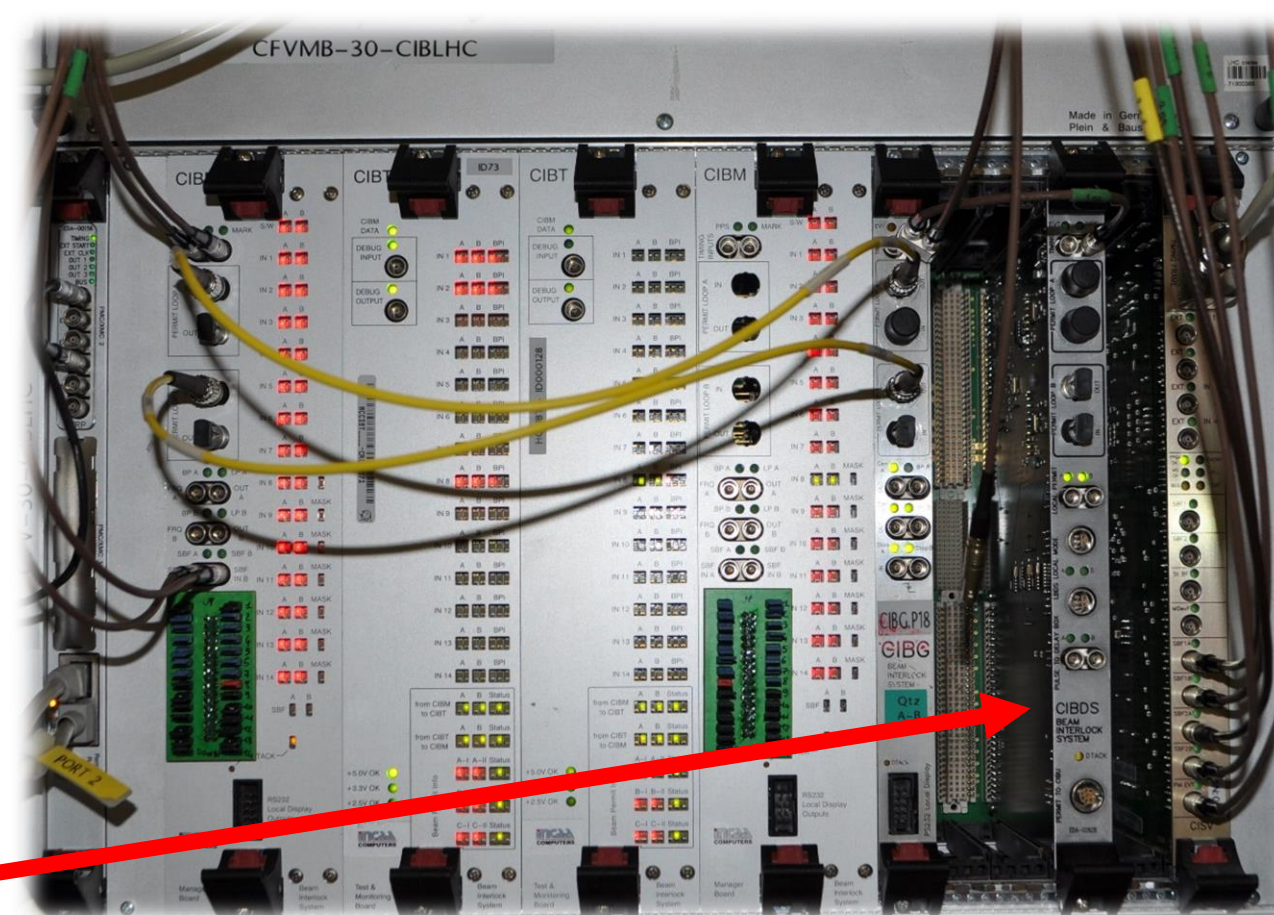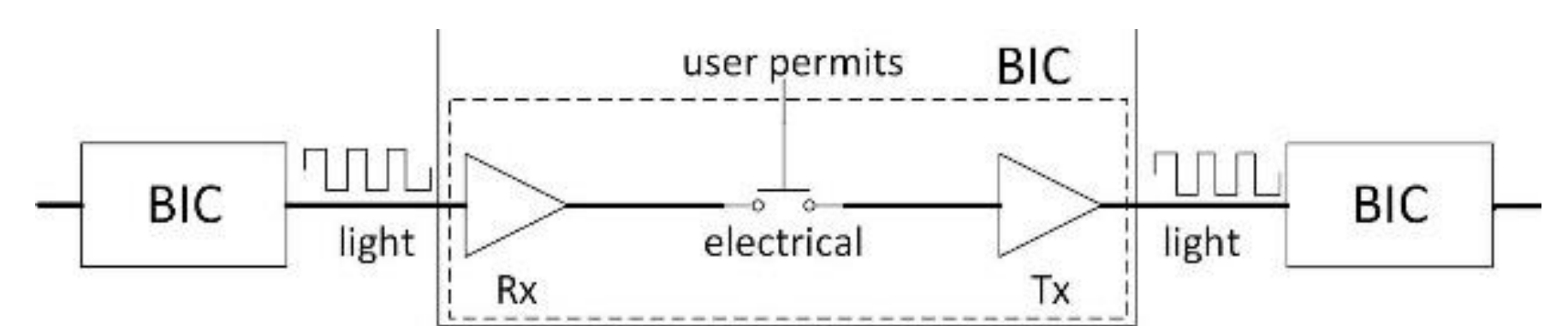D. Calcoen, S. Gabourin, A. Siemko CERN

TE
MPE

Beam Interlock System (BIS)
and
LHC Beam Dump System (LBDS)

Experience collected for the first 10 months of LHC run 2 operation :
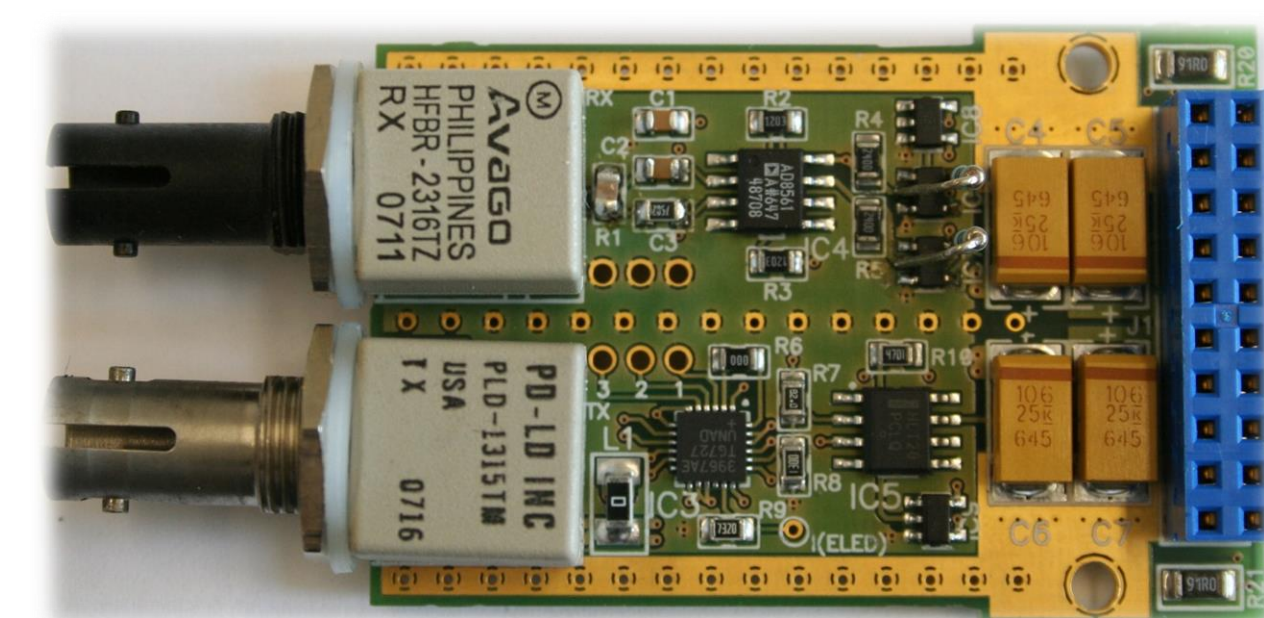2 beam dump request induced by a CIBDS
and some lessons learned.

LHC Run 1

- 2 circulating beams
- redundancy for each beam
- 4 optical fiber paths

Lesson 1.
6 different frequency detectors (3 x redundancy)
Realized by different persons implementing different
algorithms and parameters. Good for reliability. But this ends in 6 triggers at
different time due to the different sensitivity. To be harmonized.

Introduction of CIBDS

LHC Run 2

added a diverse redundancy for
detection and beam dump trigger

Beam Interlock System Controller (BIC)

BIC rack populated
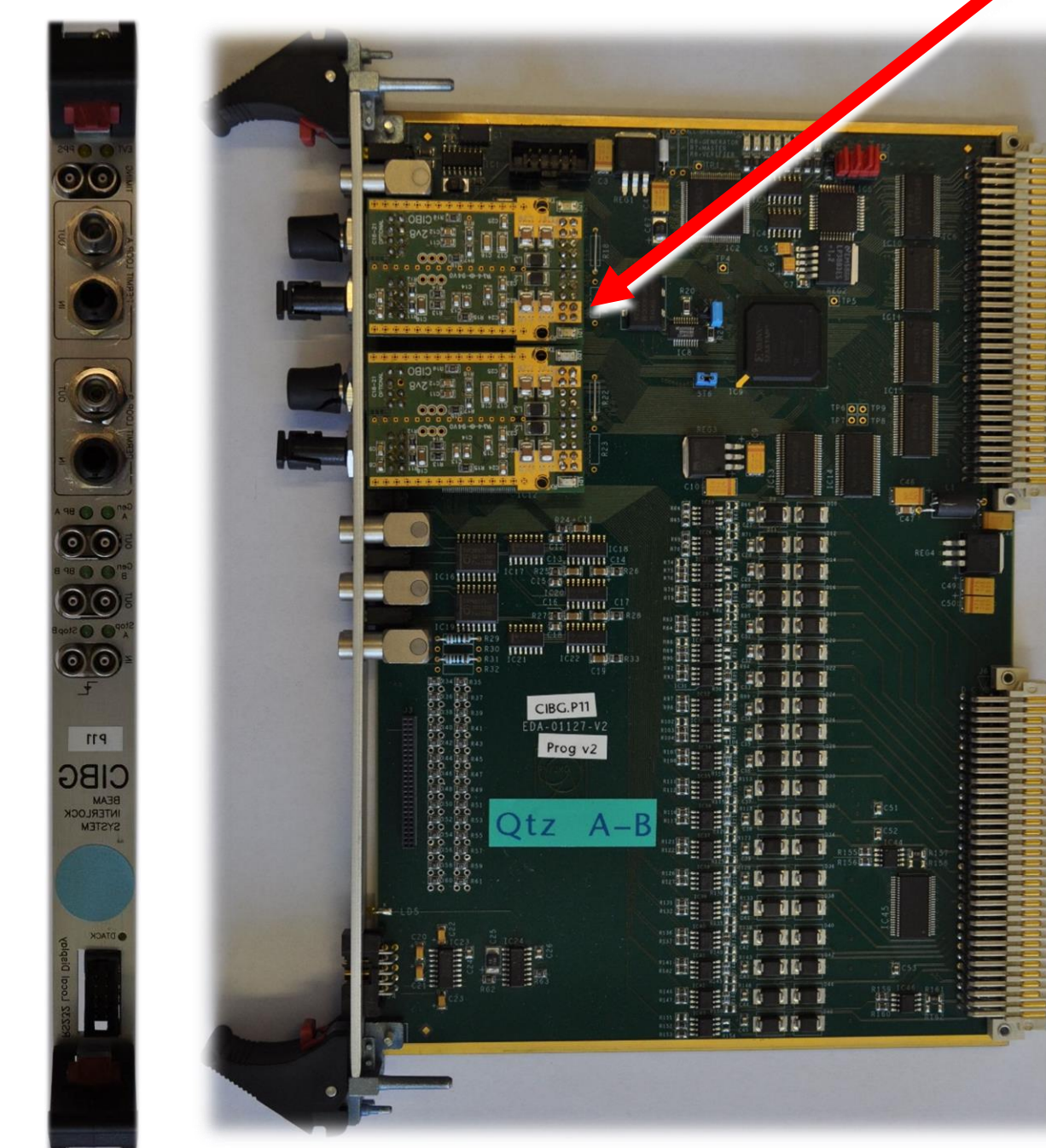
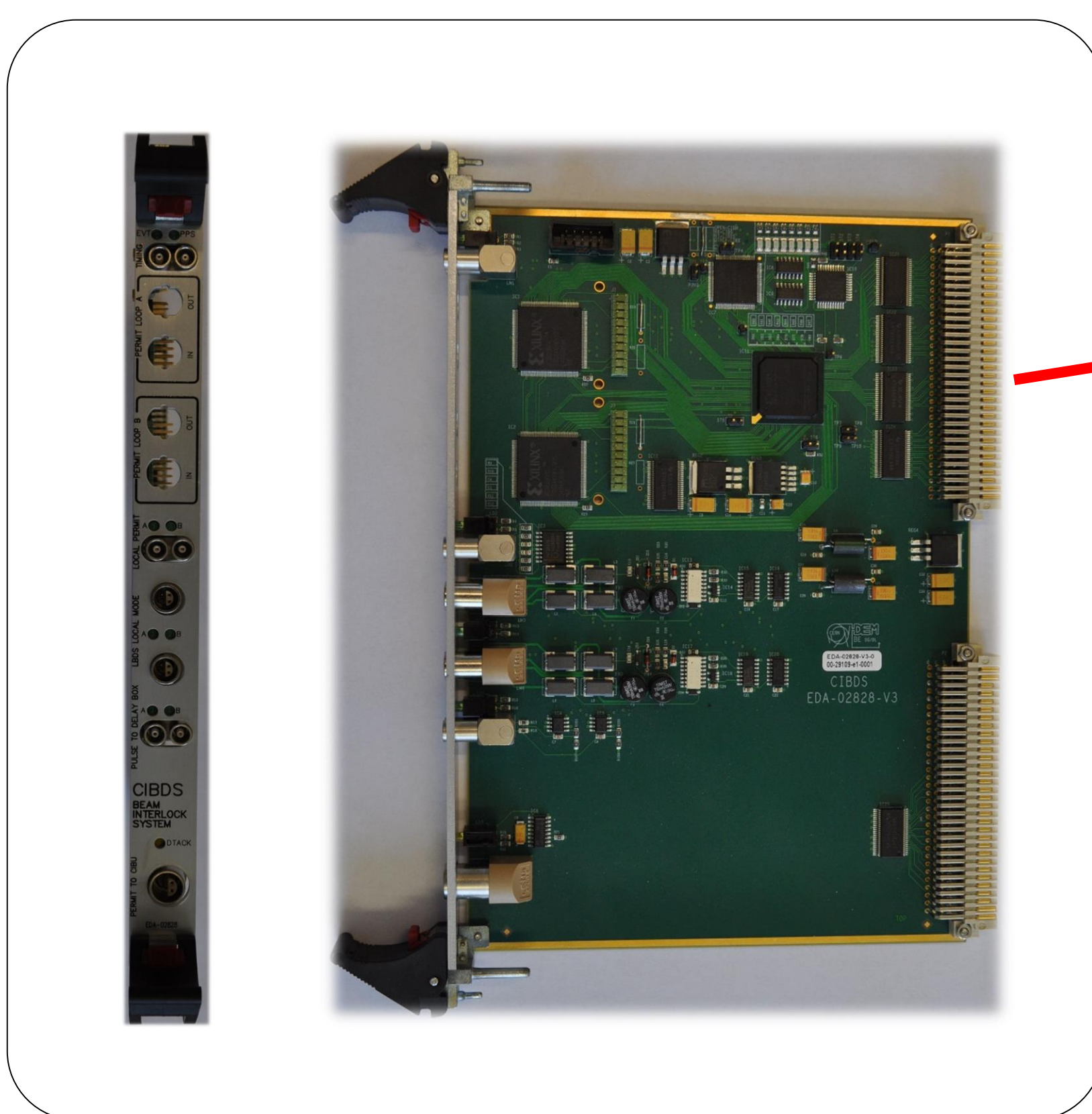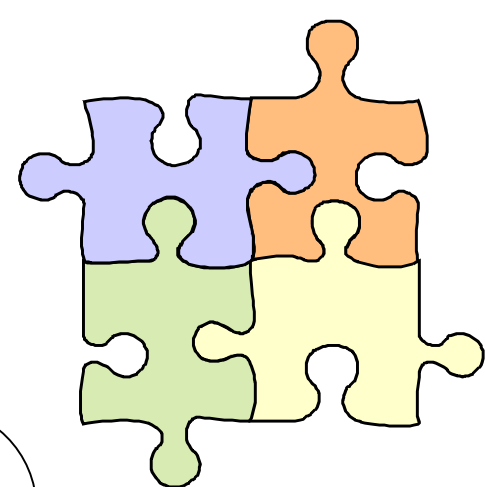CIBG - Beam Permit generator

CIBM - permit matrix

Optical elements

Lesson 2. If your component has high dispersion +
current and temperature dependency, you will end
with one in the worst case. Power margin at
minimal and noise at maximal.
Research for replace with Small Form-Factor
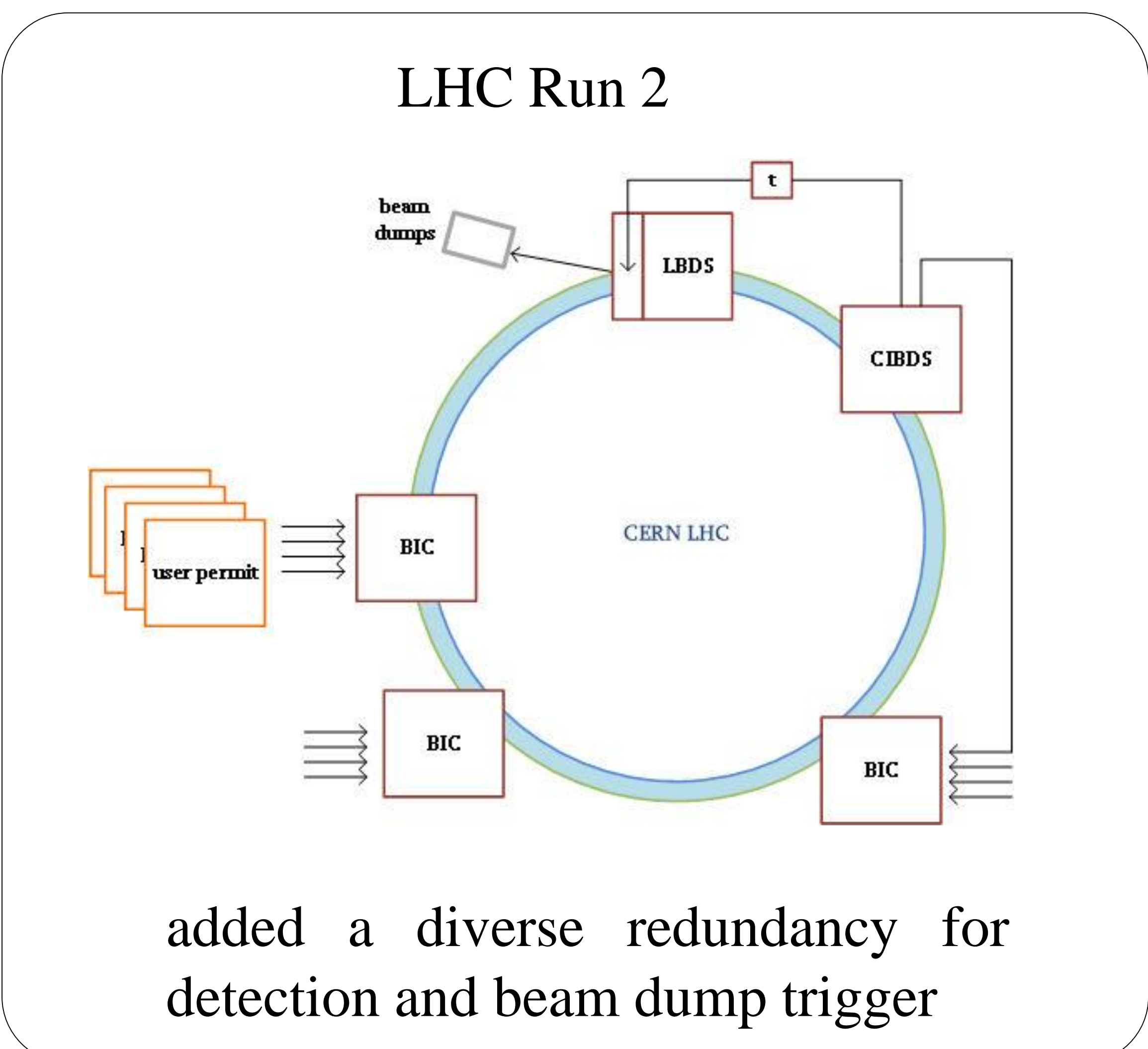Pluggable transceiver (SFP) based in new laser
technologies are ongoing.

Lesson 3.
The LHC Sequencer,
"arming", timeouts
and dead-locks.
(applications does
what programmers
writes)
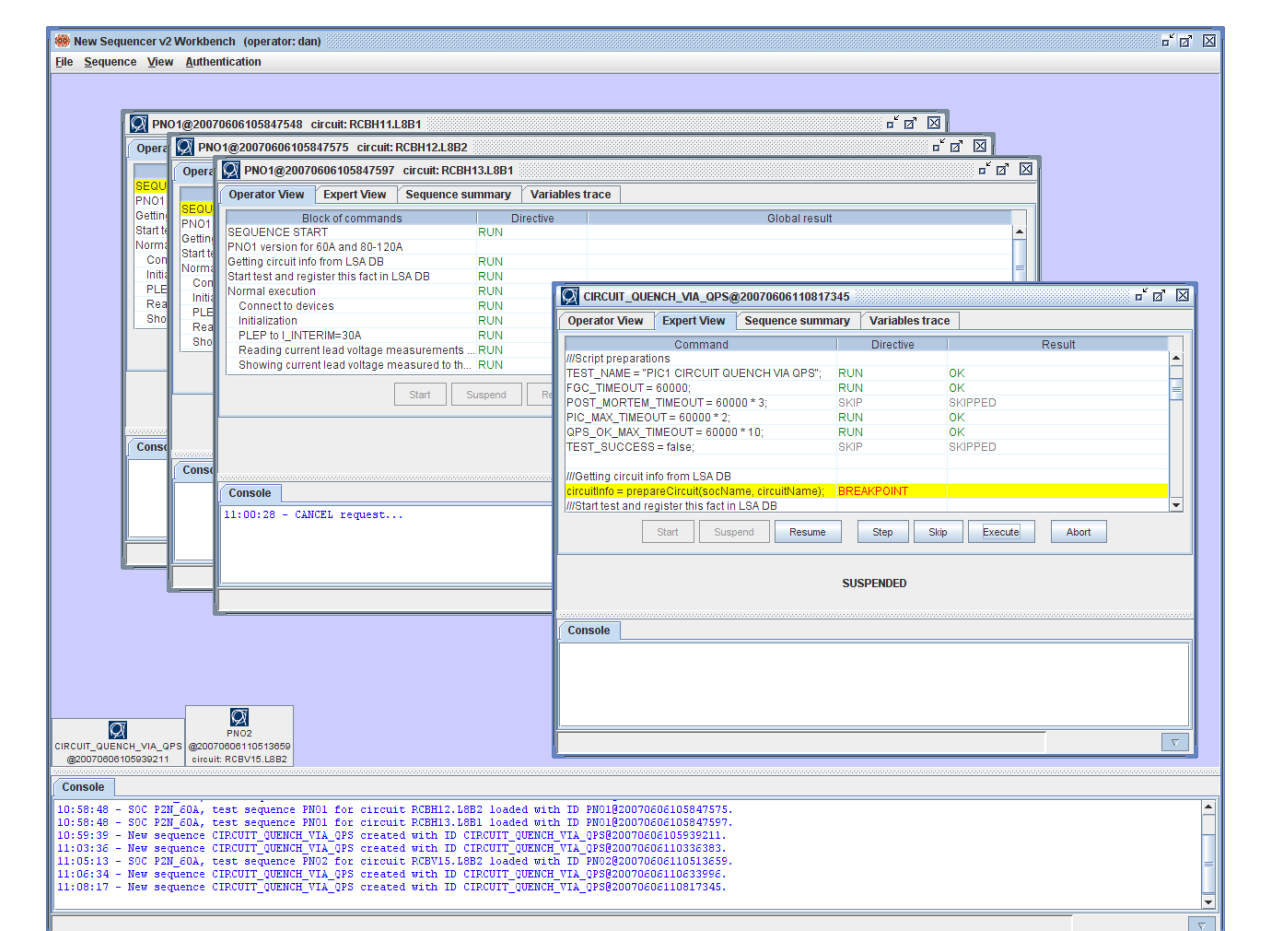
BIS and LBDS depends on each other to be in an
operational state. This creates a deadlock situation
at the start-up when both systems are not ready.
There is a special "arming" sequence guarded by
timeouts to overcome this.
If you introduce a third element that is also
dependent on the previous two, your old automatic
application running the "arming" sequence needs
to be modified accordingly. (Exploration on other
methods to overcome the dead-lock are ongoing)