

1st Workshop on SiPM cooling for the SciFi Tracker

17 October 2013, CERN

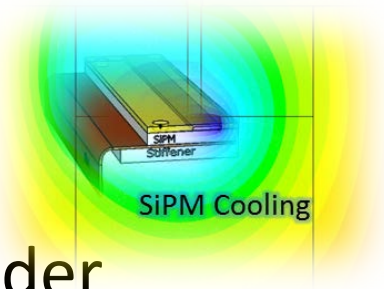
Local organizing group:

P.Gorbounov (CERN/ITEP)
E.Thomas (CERN PH-LBO)

Advisory group:

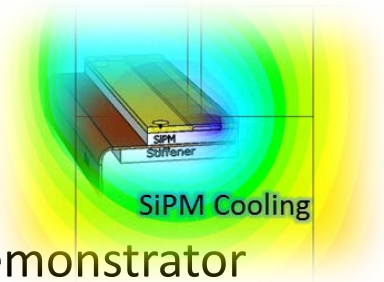
R.Lindner (CERN PH-LBO)
C.Joram (CERN PH-DT)
P.Petagna (CERN PH-DT)
V.Vacek (CTU, Prague)

Objectives



- To discuss SiPM cooling issues within a wider community, collect opinions and inputs from detector cooling experts;
- (try to) converge on the preferred technology for the cooling (single-phase, 2-phase, thermo-electric, dry air, etc...) and a likely backup solution;
- To give momentum to pre-TDR work, e.g. identify the cooling aspects to study with a demonstrator module
- To prompt new groups to join the SiPM cooling project

Speakers



B. Leverington (Uni. of Heidelberg, coordinator of the Demonstrator Module project): introduction to the Fiber Tracker, SciFi module and the end-cap design

P. Gorbounov (CERN PH-LBO, coordinator of the SiPM cooling work package): requirements/options, more on TE cooling

E. Da Riva (CERN EN-CV): on the thermal analysis and CFD simulation for the SiPM cooling project

V. Vacek (CTU, Prague): on cooling tests with FT end-cap prototypes, performed in summer 2013 by the CTU student team; outlook

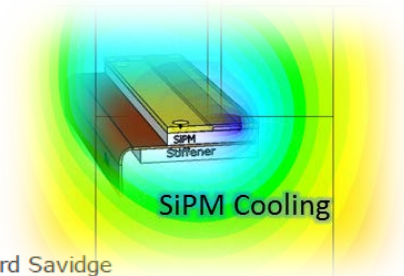
G.Hallewell (CPPM, Marseille): on choice of refrigerants, use of thermosyphon option

B.Verlaat (NIKHEF): on various thermal aspects of SiPM cooling (including “whether or not CO2 cooling is good for us?”)

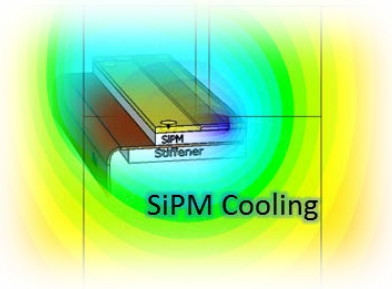
M.Battistin (CERN EN-CV): experience from construction and operation of detector cooling systems for the LHC Experiments, cost estimates

Thursday, 17 October 2013

- 09:00 - 09:10 **Introduction 10'**
Speaker: Petr Gorbounov (CERN and ITEP/Moscow)
- 09:10 - 09:40 **Current status of the FT end cap design 30'**
Speakers: Blake Dean Leverington (Ruprecht-Karls-Universitaet Heidelberg (DE)), Trevor Edward Savidge (Imperial College Sci., Tech. & Med. (GB))
- 09:40 - 10:10 **SiPM cooling: requirements, challenges, options 30'**
Speaker: Petr Gorbounov (CERN and ITEP/Moscow)
- 10:10 - 10:40 **Summary: thermal analysis, CFD simulation 30'**
Speaker: Dr. Enrico Da Riva (CERN)
- 10:40 - 11:00 **Coffee break (20')** **Coffee served at 160-1-009, expo....**
- 11:00 - 11:30 **Summer tests: air and evaporative (C3F8) cooling, outlook 30'**
Speaker: Vic Vacek (Czech Technical University (CZ))
- 11:30 - 12:00 **Evaporative cooling: choice of a refrigerant, pFC blends. 30'**
Speaker: Gregory Hallewell (Centre National de la Recherche Scientifique (FR))
- 12:00 - 12:20 **Hybrid options involving Peltier coolers 20'**
Speaker: Petr Gorbounov (CERN and ITEP/Moscow)
- 12:20 - 13:50 **Lunch break (1h30')**
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- 13:50 - 14:20 **Thermal challenges for SiPM cooling 30'**
Speakers: Paolo Petagna (CERN), Bart Verlaat (NIKHEF-CERN)
- 14:20 - 14:50 **Cost estimate: C2F6-based evaporative and C6F14-based single-phase options 30'**
(Tentative title, TBC)
Speaker: Michele Battistin (CERN)
- 14:50 - 16:15 **Discussion, short communications (one more review presentation?)**
(possible contributions: B.Leverington, G.Haefeli..., everybody is invited and welcome!)
Convener: Eric Thomas (CERN)
- 16:15 - 16:30 **Summary, outlook 15'**
Speakers: Petr Gorbounov (CERN and ITEP/Moscow), Frederic Henry Blanc (Ecole Polytechnique Federale de Lausanne (CH))



References, links



1. ["Framework TDR \(FTDR\) for the LHCb Upgrade"](#), CERN-LHCC-2012-007 ; LHCb-TDR-12, also available at the LHCb Secretariat
2. ["Viability Assessment of a Scintillating Fibre Tracker for the LHCb Upgrade"](#), LHCb-INT-2013-004
3. [SiPM cooling specifications v.1.2](#)
4. [SiPM cooling simulation Project Proposal](#)
5. [List of refrigerants](#)
6. [Thermacore \(UK\) presentation at CERN + review of low-temperature heat pipes \(P.Gorbunov\)](#)