

Water cooling maintenance and improvement at Elettra

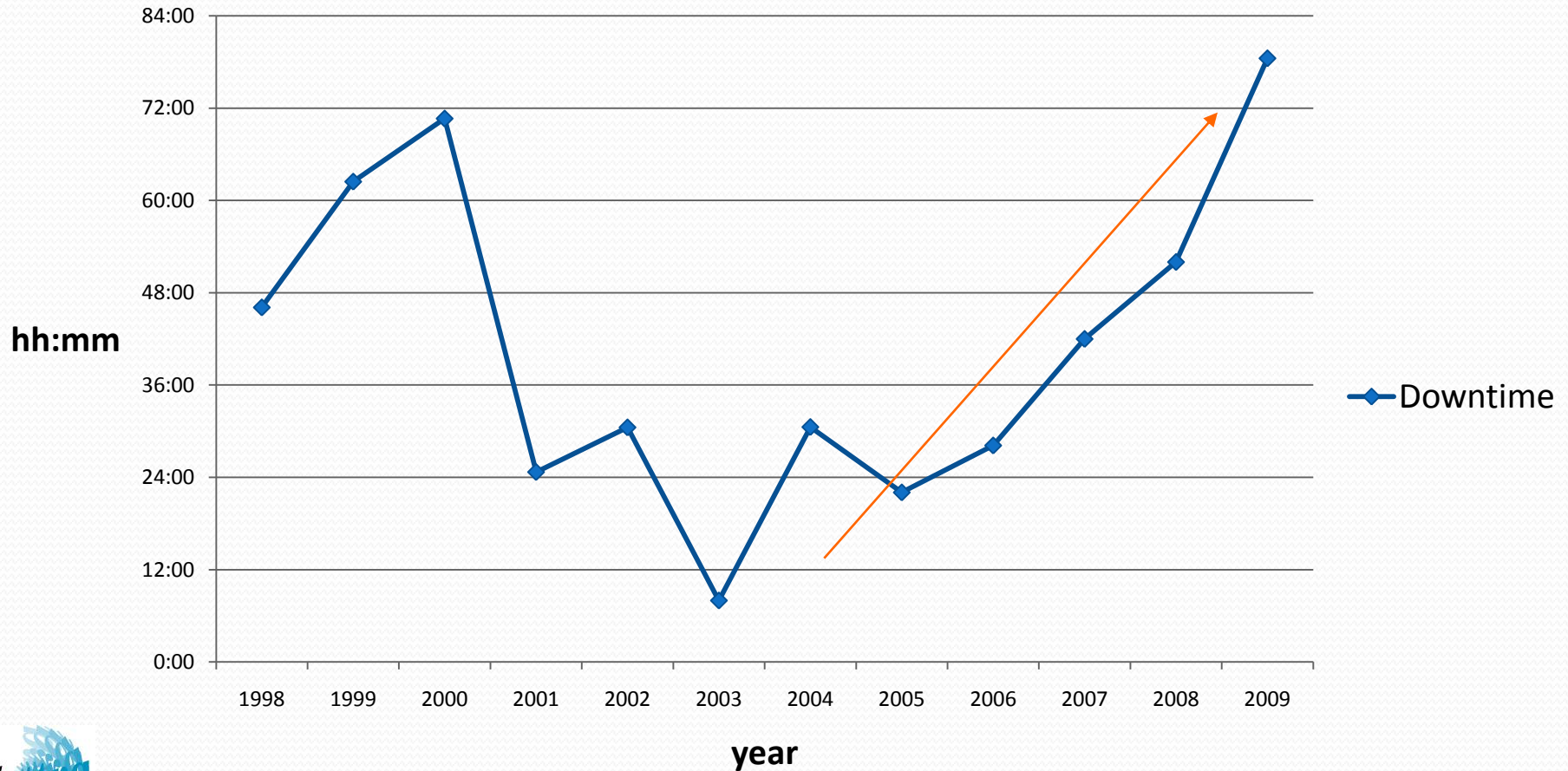
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Acknowledgments:

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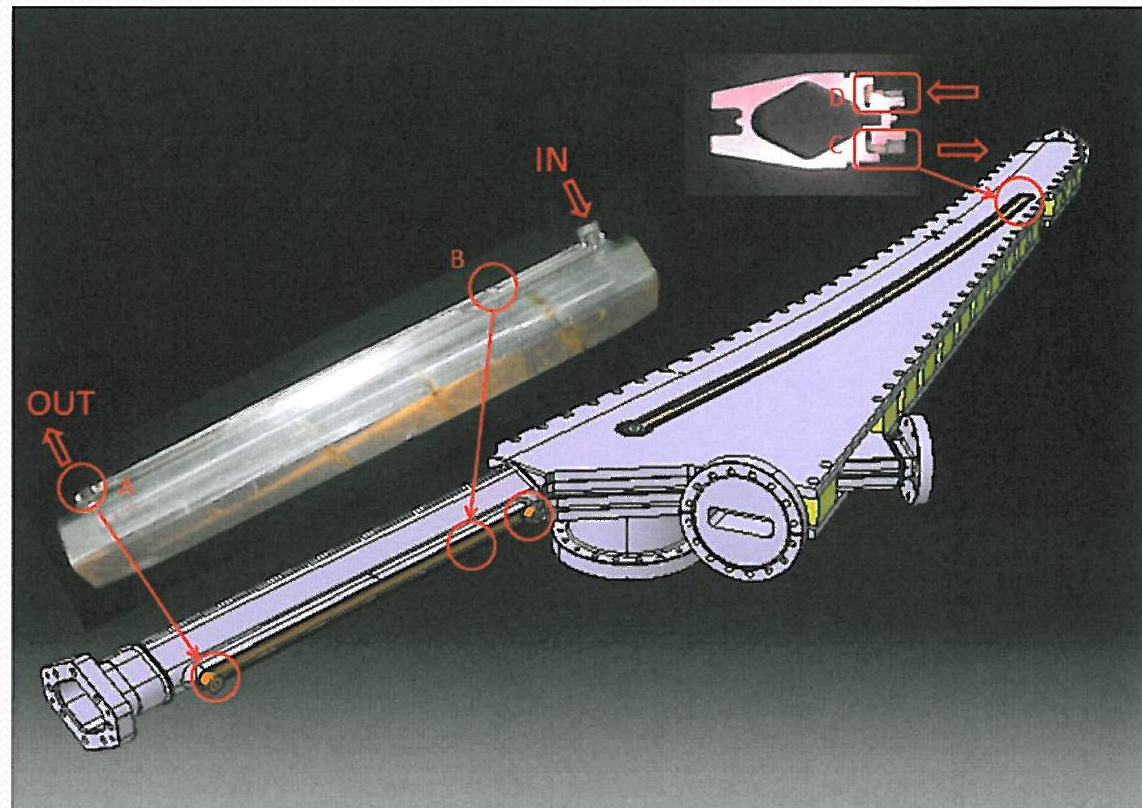
Statistic

Downtime due to water system



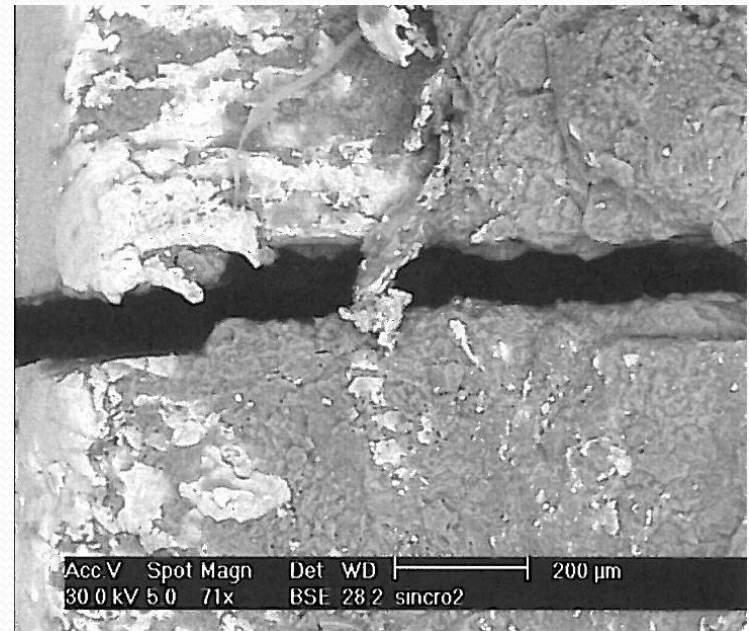
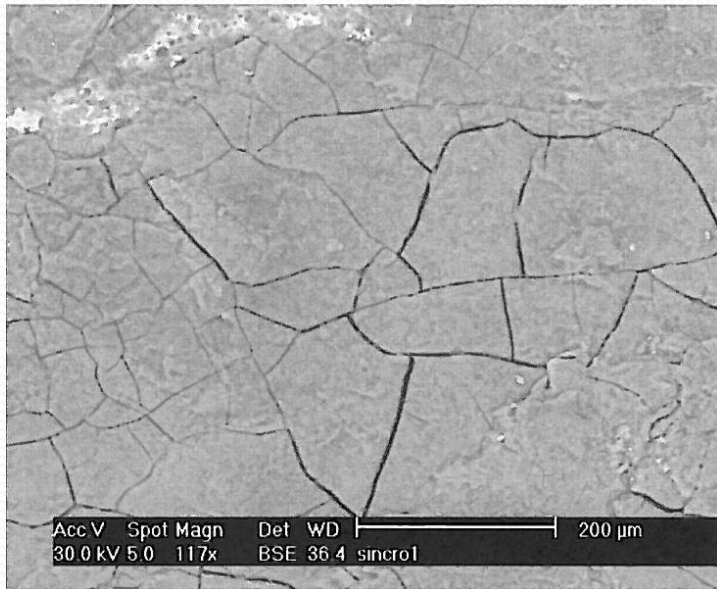
Light exit chamber

- The main-central part is realized in AL 5082 (Peraluman)
- The rhomboid exit chamber is realized in AL 6060 (Anticorodal)
- The water tube is realized in AL 5082.

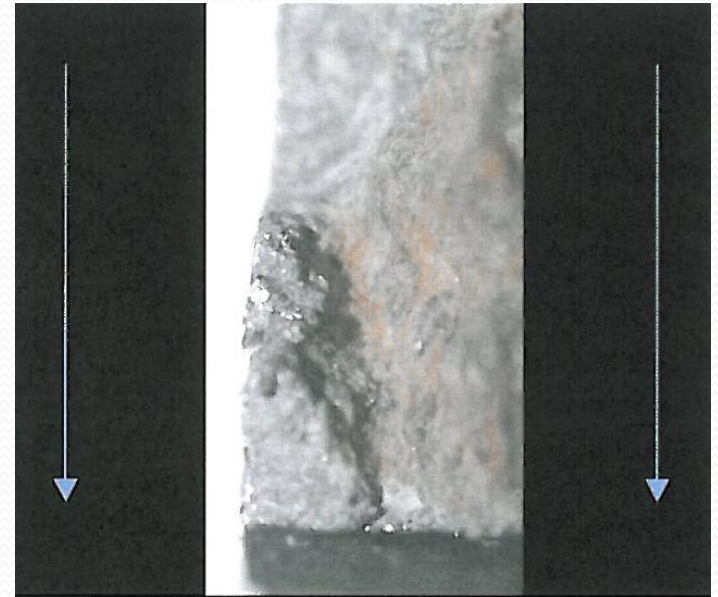


Causes:

- **Crevice corrosion** is a localized form of corrosion due to stagnant microenvironments in crevices – 100um gap long the welds



- **Pitting corrosion** is a localized form of corrosion by which cavities or "holes" are produced in the material. It's due to different oxygen density.
- **Erosion corrosion** is an acceleration in the rate of corrosion attack in metal due to the relative motion of a corrosive fluid and a metal surface) - 10m/s->2m/s.
- **Stress corrosion cracking** is the cracking induced from the combined influence of tensile stress (directly applied or residual stress) and a corrosive environment.



Dematerialized water

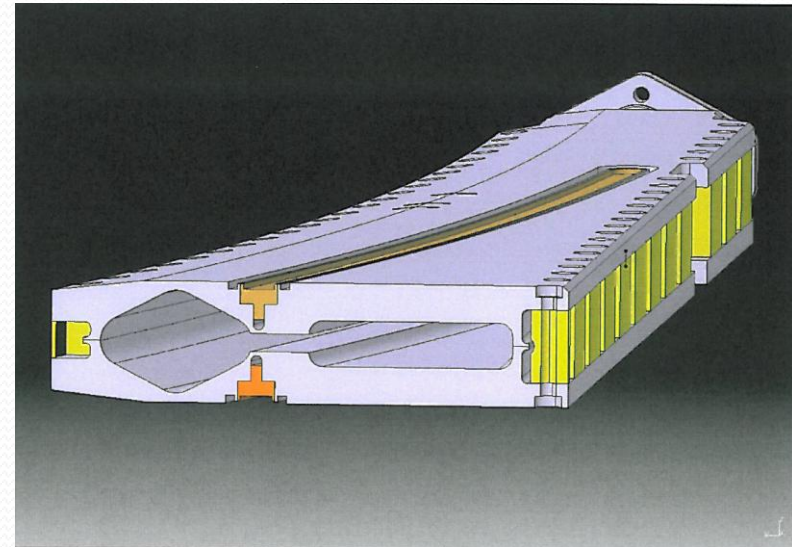
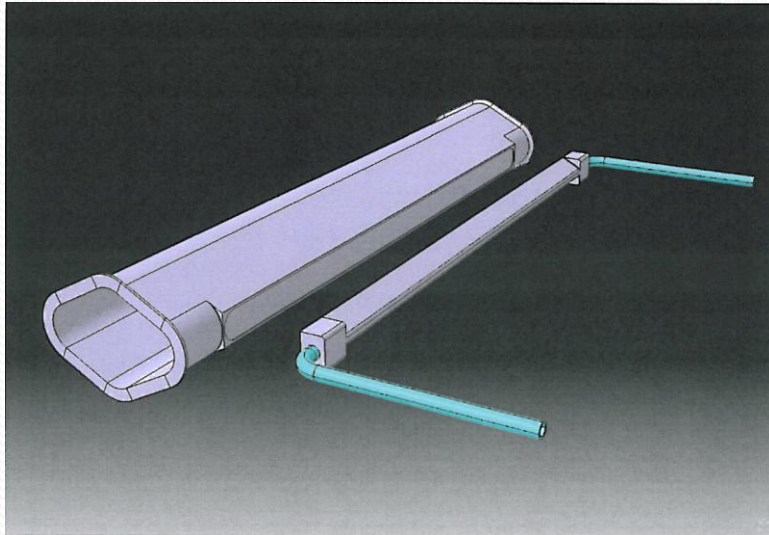
	Closed circuit water	Normal water
Iron	31 $\mu\text{g/l}$	< 10 $\mu\text{g/l}$
Chromium	< 1 $\mu\text{g/l}$	
Nickel	23 $\mu\text{g/l}$	Law < 20 $\mu\text{g/l}$ D.Leg. 02/02/2001 n.31
Copper	< 0.005 mg/l	
Aluminum	< 0.02 mg/l	
Chlorides	17.9 mg/l	11 mg/l
pH	7.50 U. pH	7.70 U. pH
K20 Spec. Cond. 20° C	379 $\mu\text{S/cm}$	340 $\mu\text{S/cm}$

- Some filters will be installed in the water cooling system, considering the too high values of Iron, Nichel and electrical conductivity.



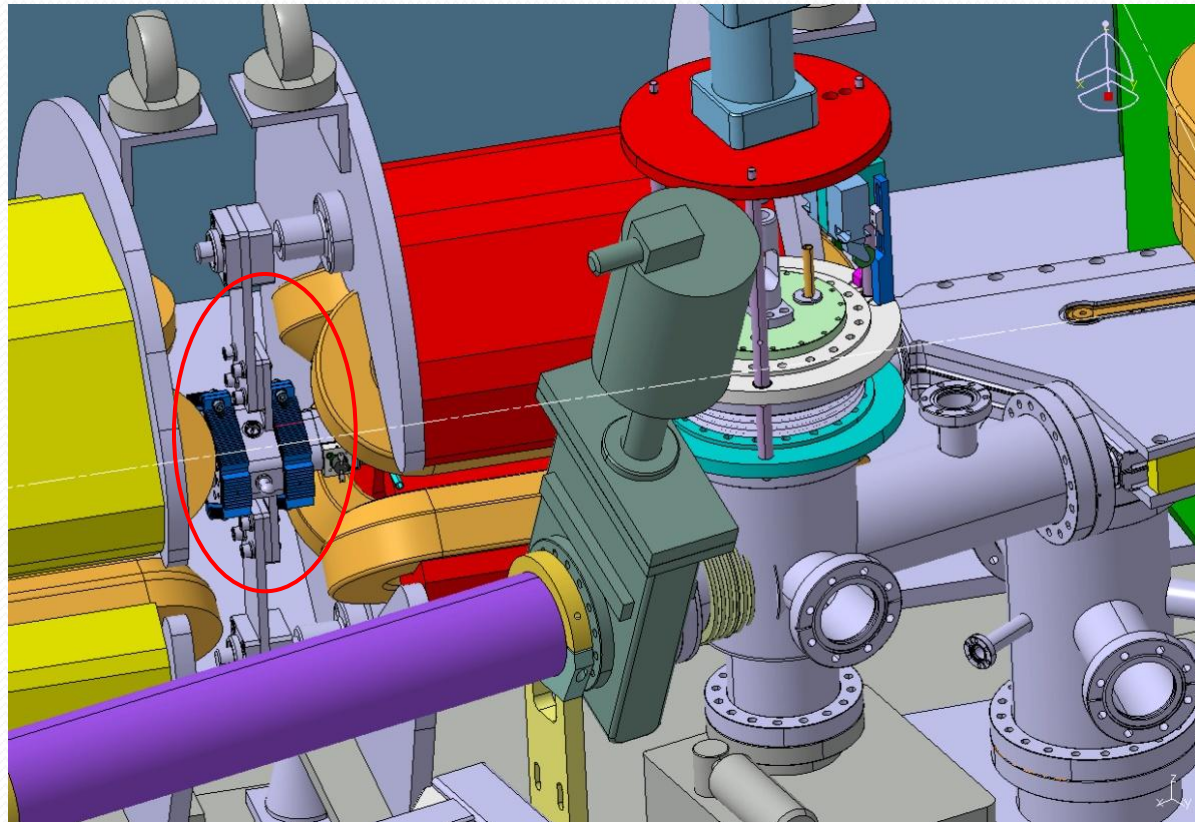
New light exit chamber project

- Removable water cooling pipe
- Prevent some corrosion effect highlighted from the microscope
- An aluminum foil will be interposed between the vacuum chamber and the water cooling system to improve the contact resistance

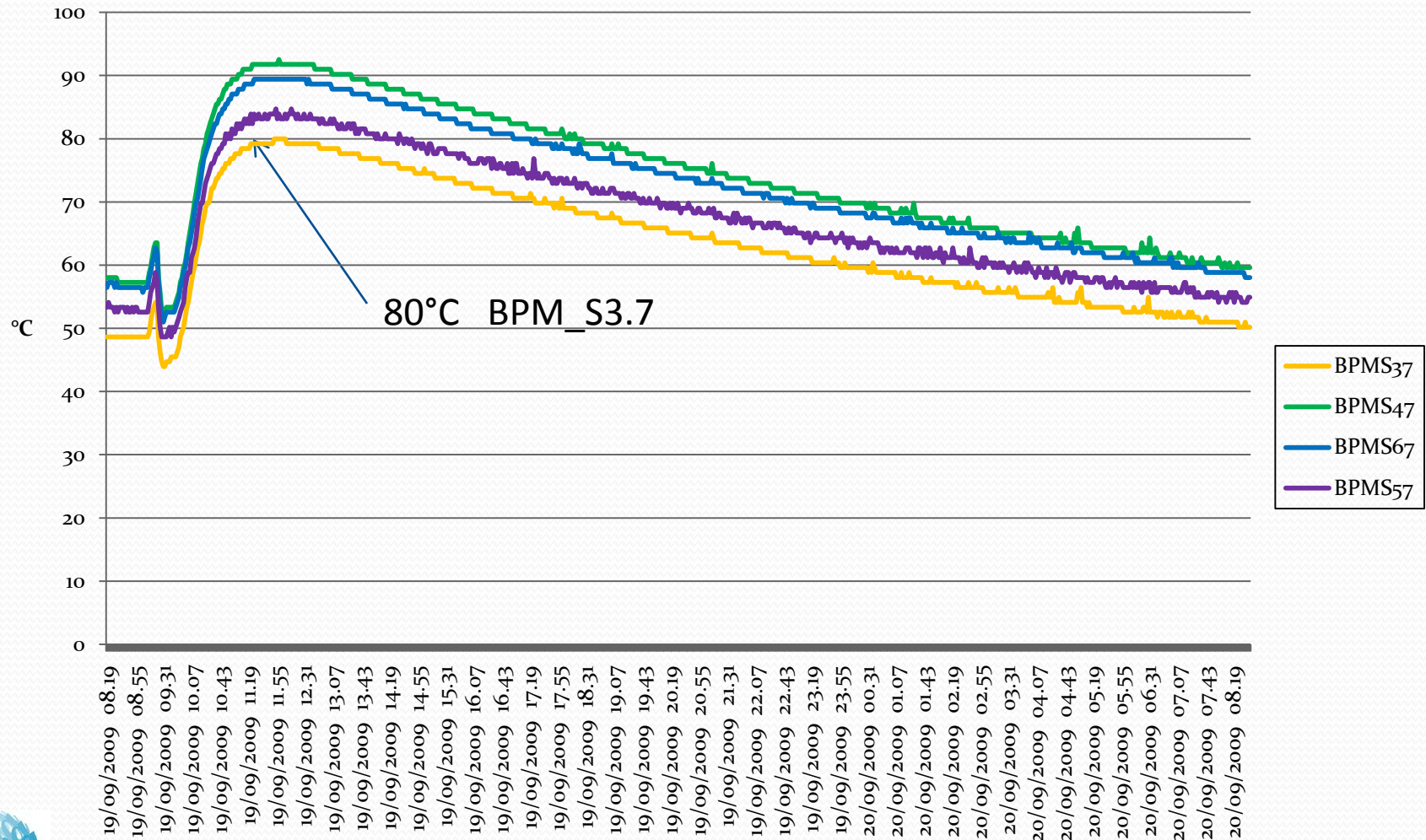


New BPM heatsink

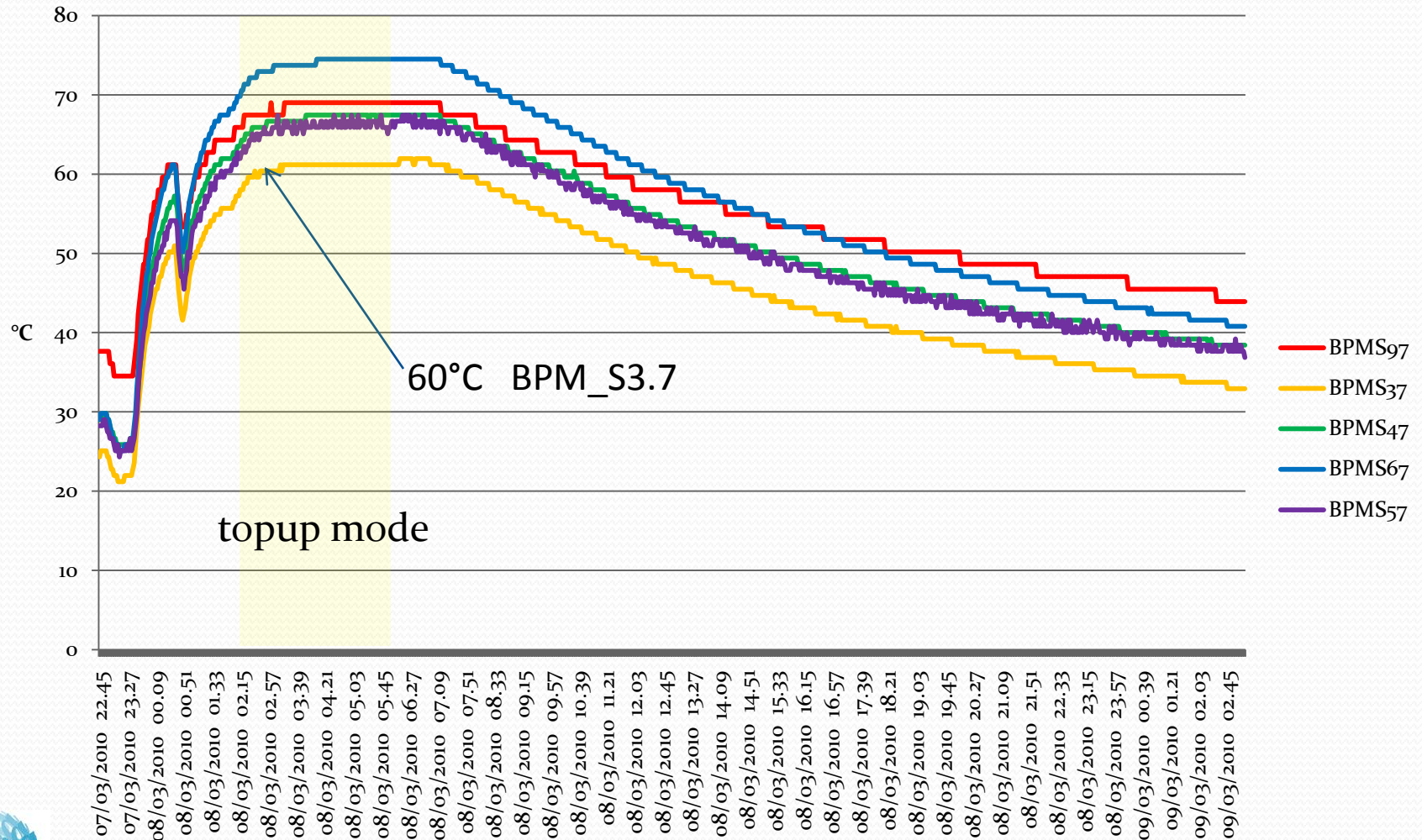
- 330mA at 2GeV
- 140mA at 2.4GeV



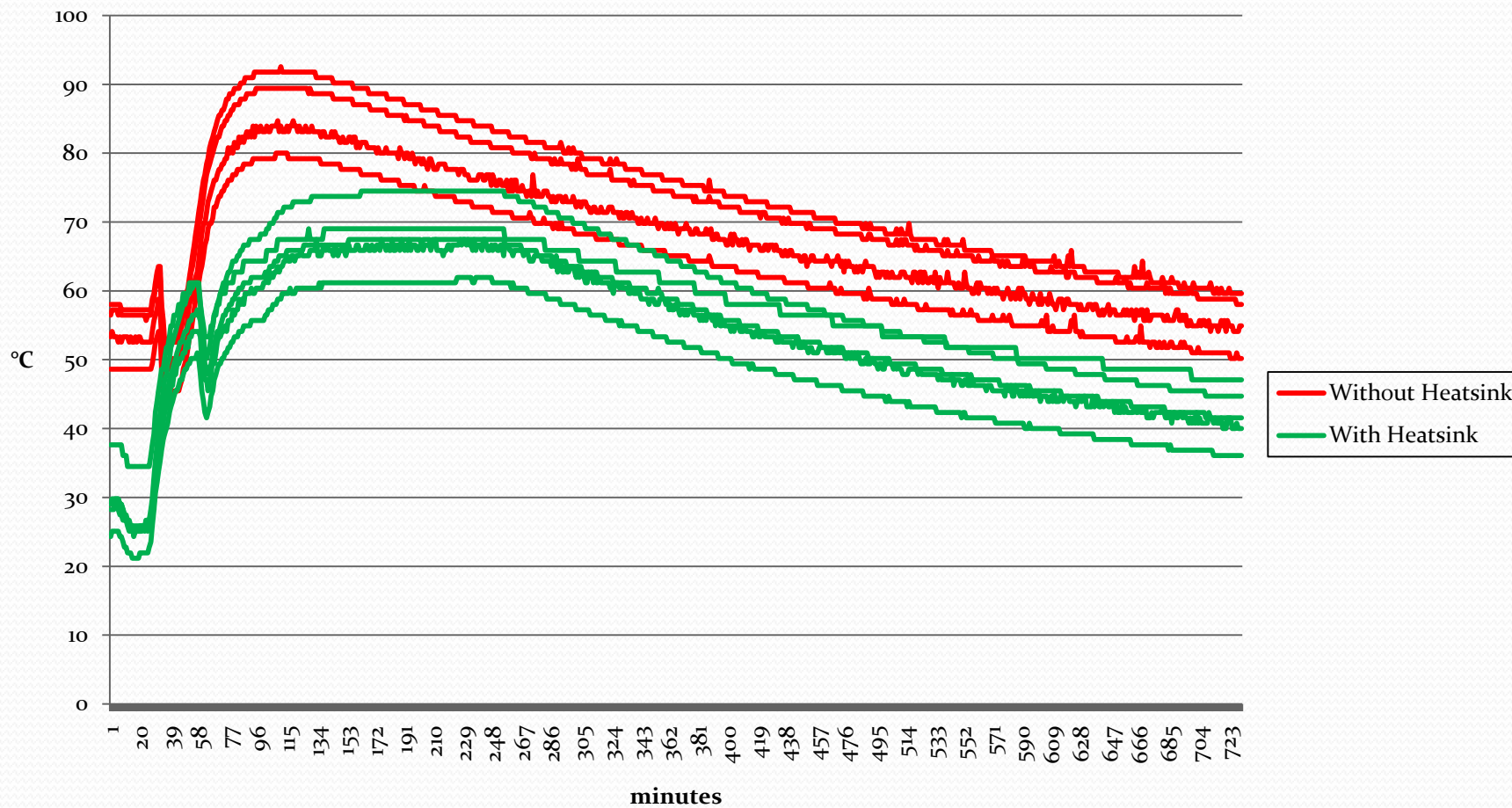
• Without heatsink – 330mA @ 2GeV



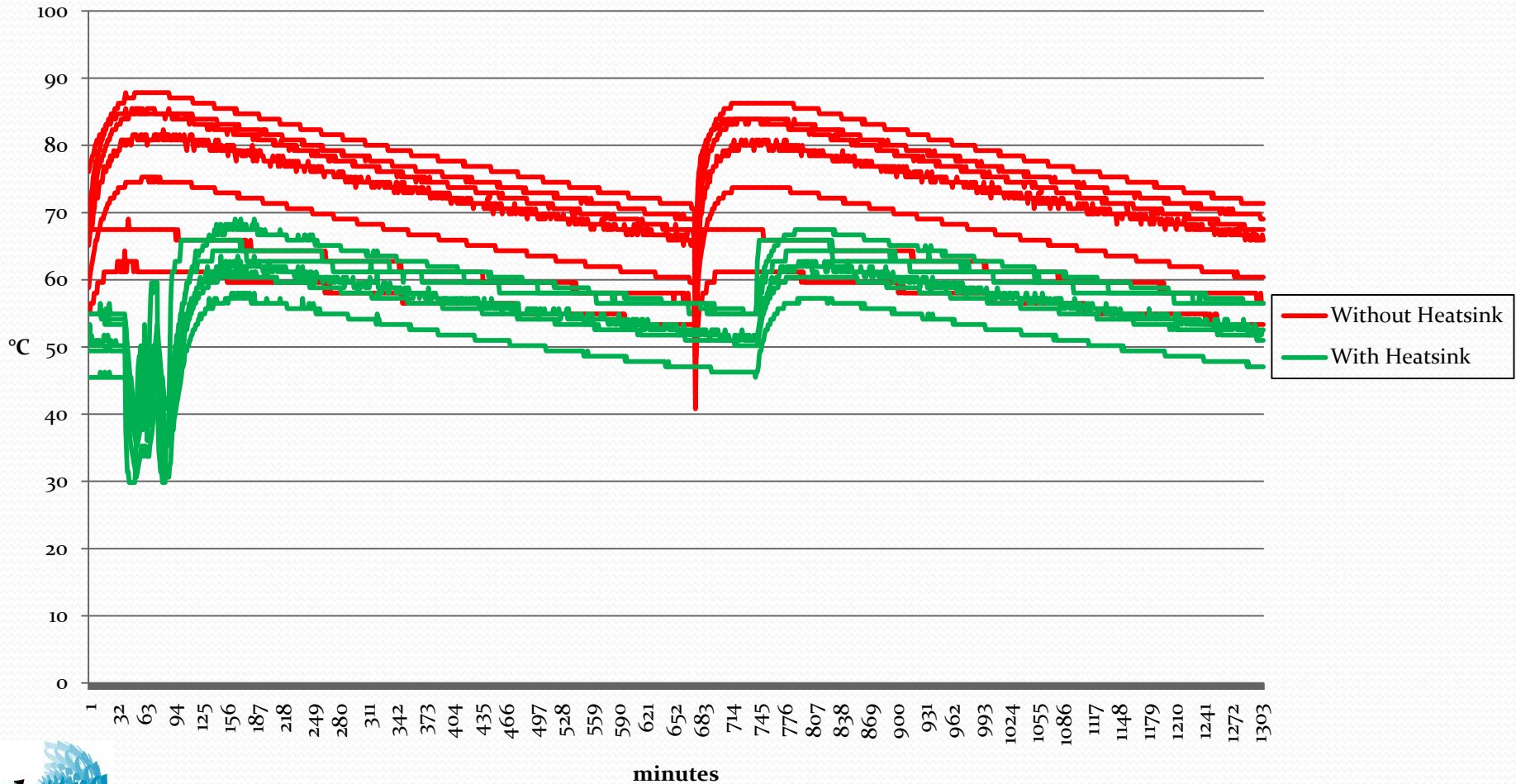
• With heatsink – 330mA @ 2GeV



• 330mA @ 2GeV



- 140mA @ 2.4GeV 10°C-20°C difference degrees



- 160mA instead 140mA @ 2.4GeV only 3-4% of temperature increasing

