

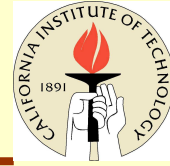
PbWO₄ Recovery and Radiation Damage Test

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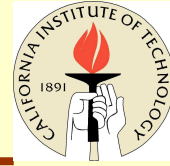
Introduction



- In the DPG meeting on June 11 data were presented that a new type of PbWO_4 crystals does not recover after Co-60 and hadron irradiations.
- While the **no recovery** may improve the stability we have to face the consequence of **no dose rate dependence**. This new type of PbWO_4 crystals must go through a different radiation test protocol as compared to crystals with recovery.



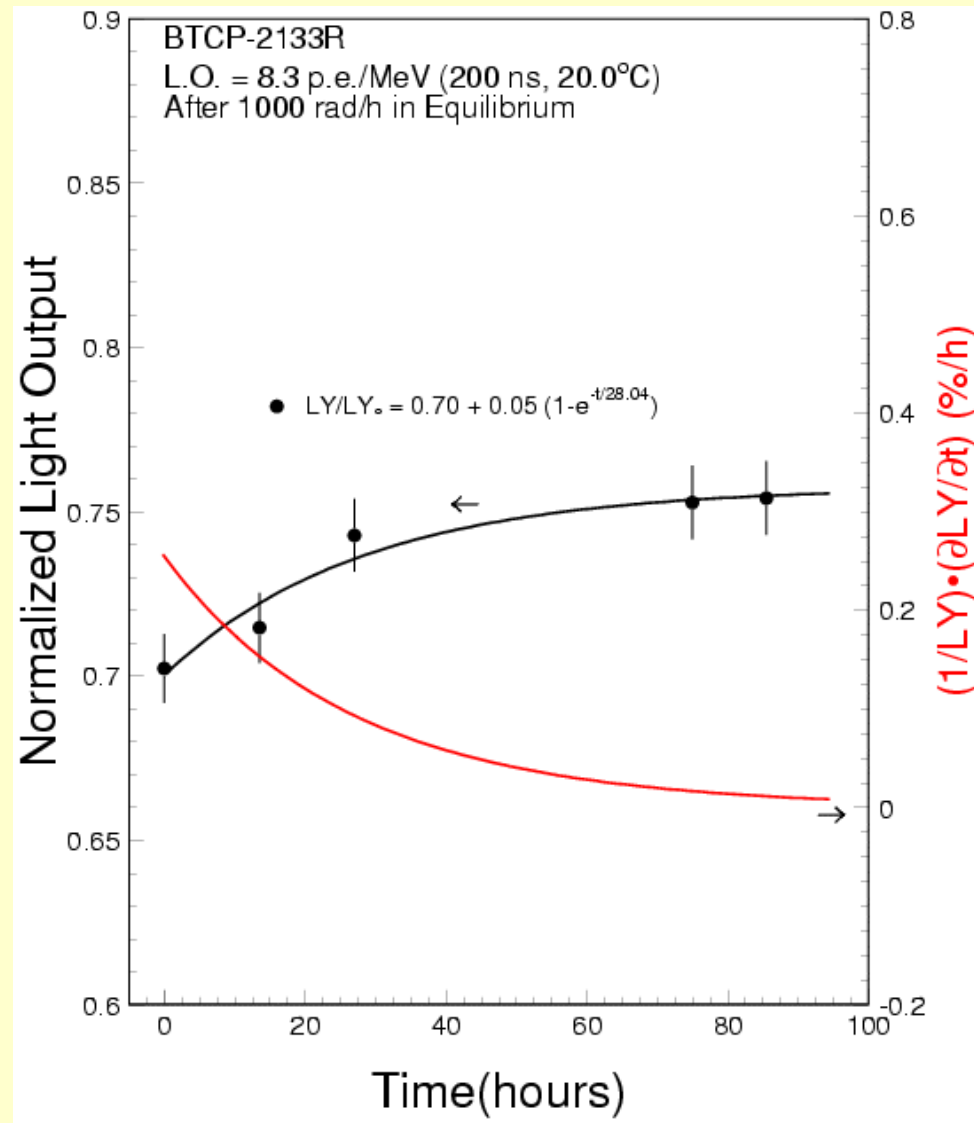
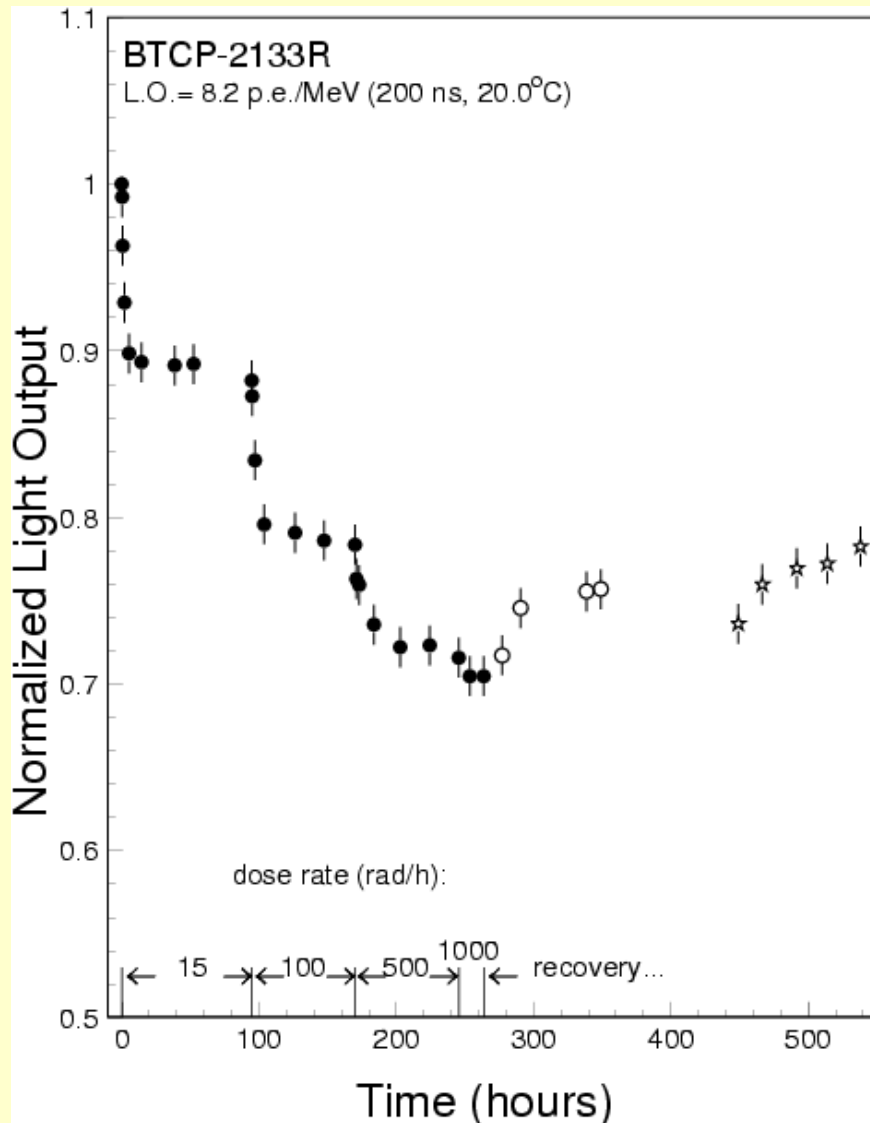
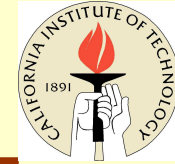
Outline



- Recovery data for some PbWO_4 samples.
- Consequence of **No Recovery**.
- Proposed Radiation Test Protocol for PbWO_4 Crystals.

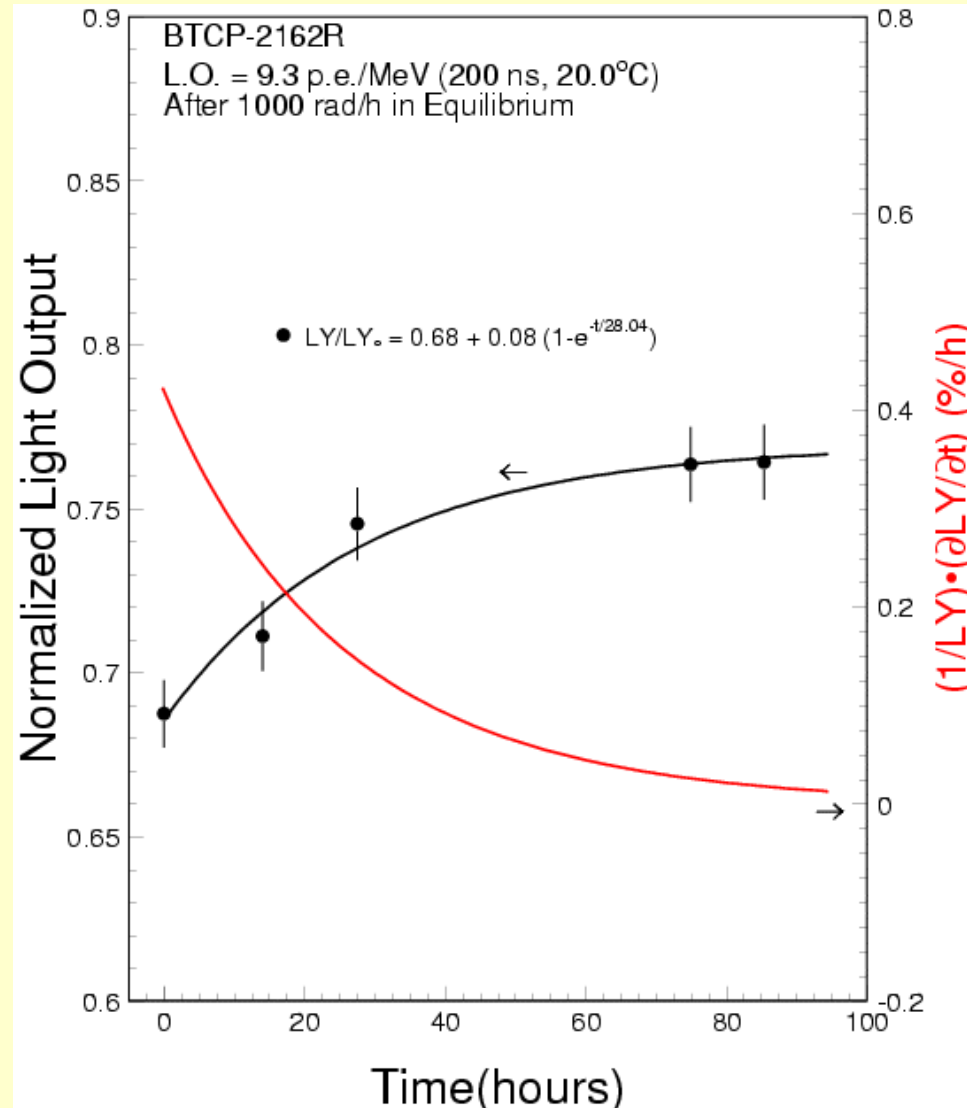
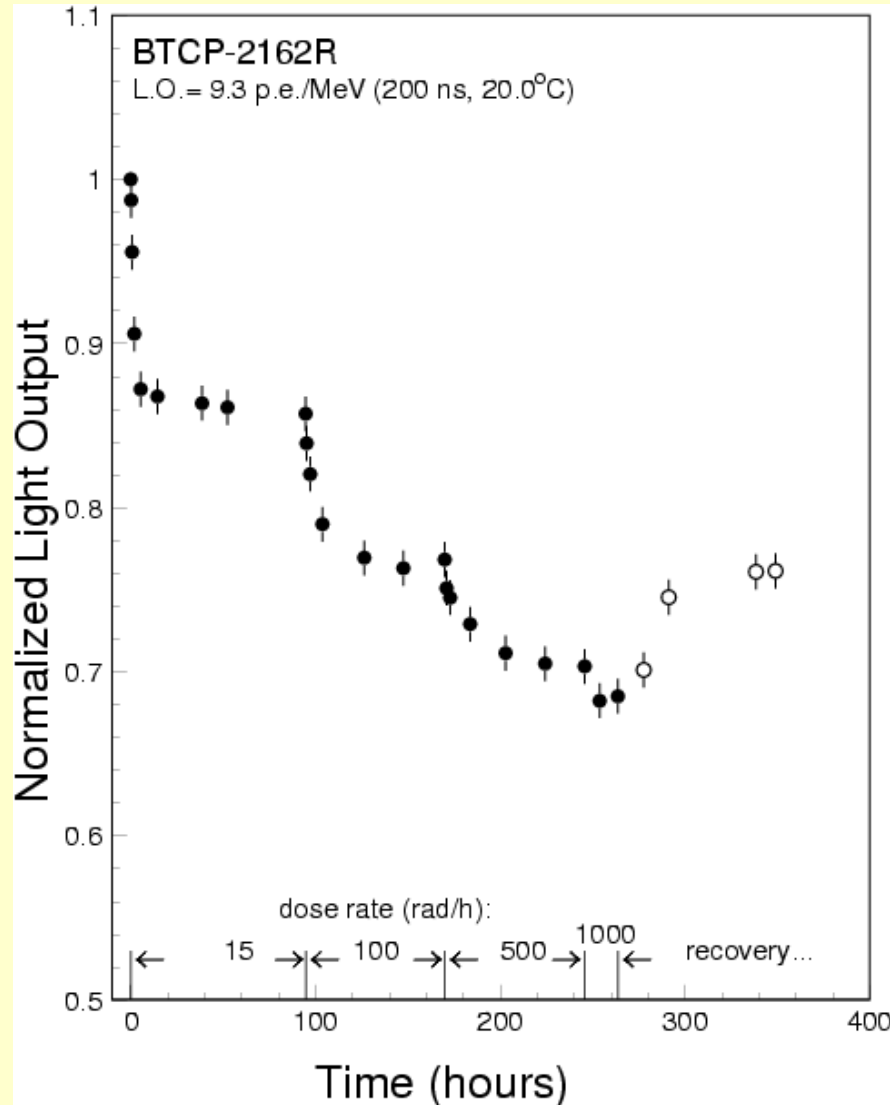
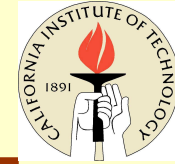


BTCP 2133 Damage Recovery



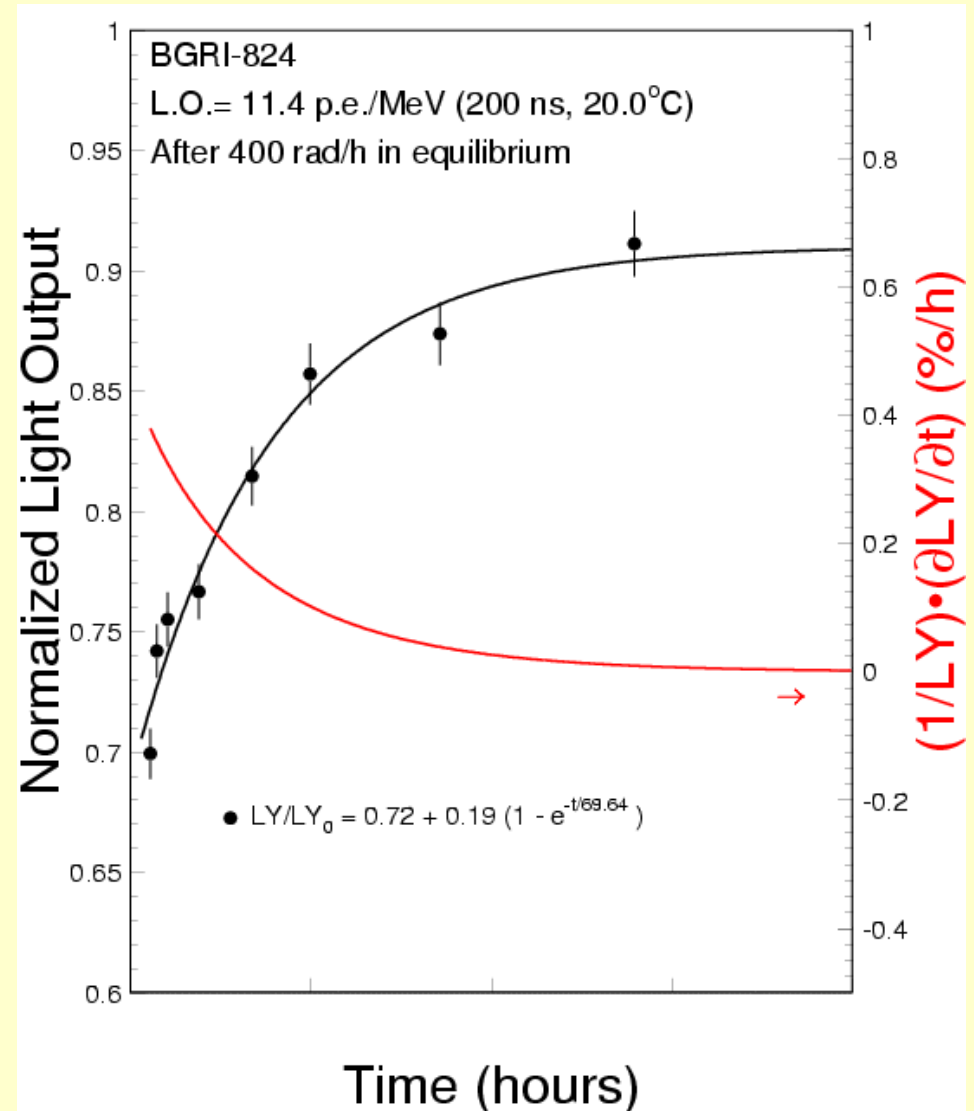
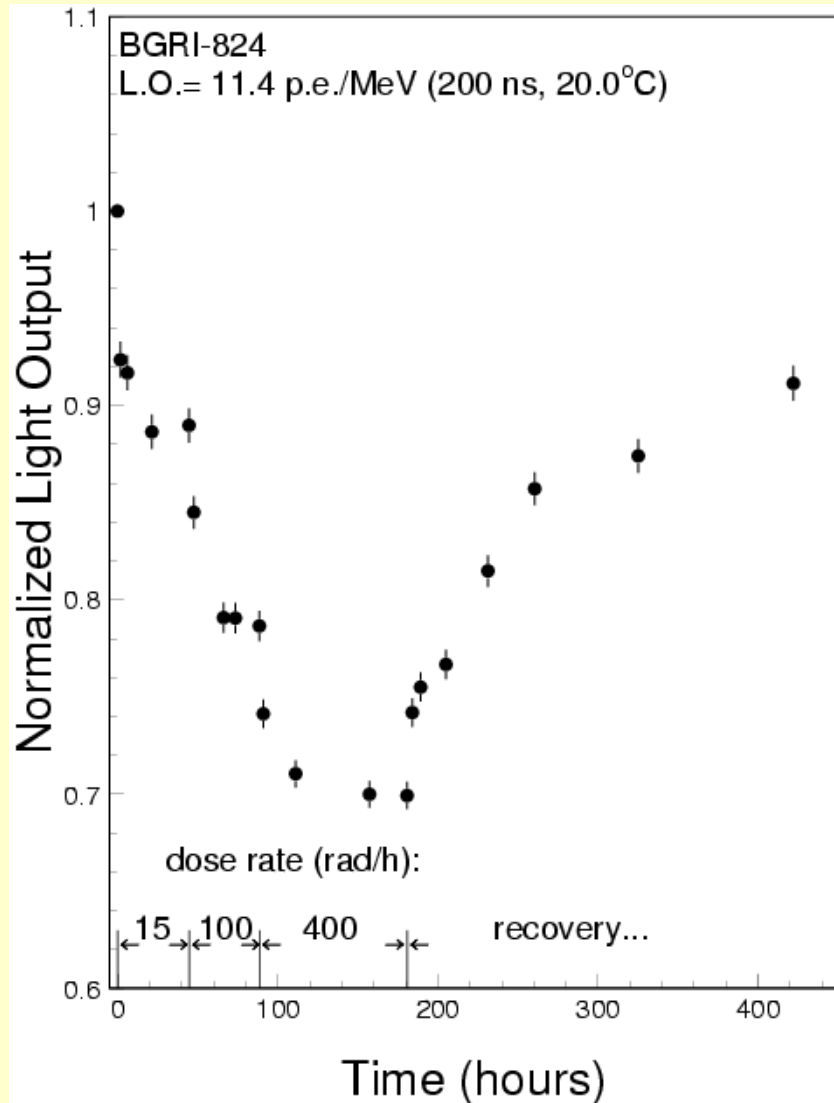
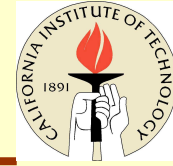


BTCP 2162 Damage Recovery



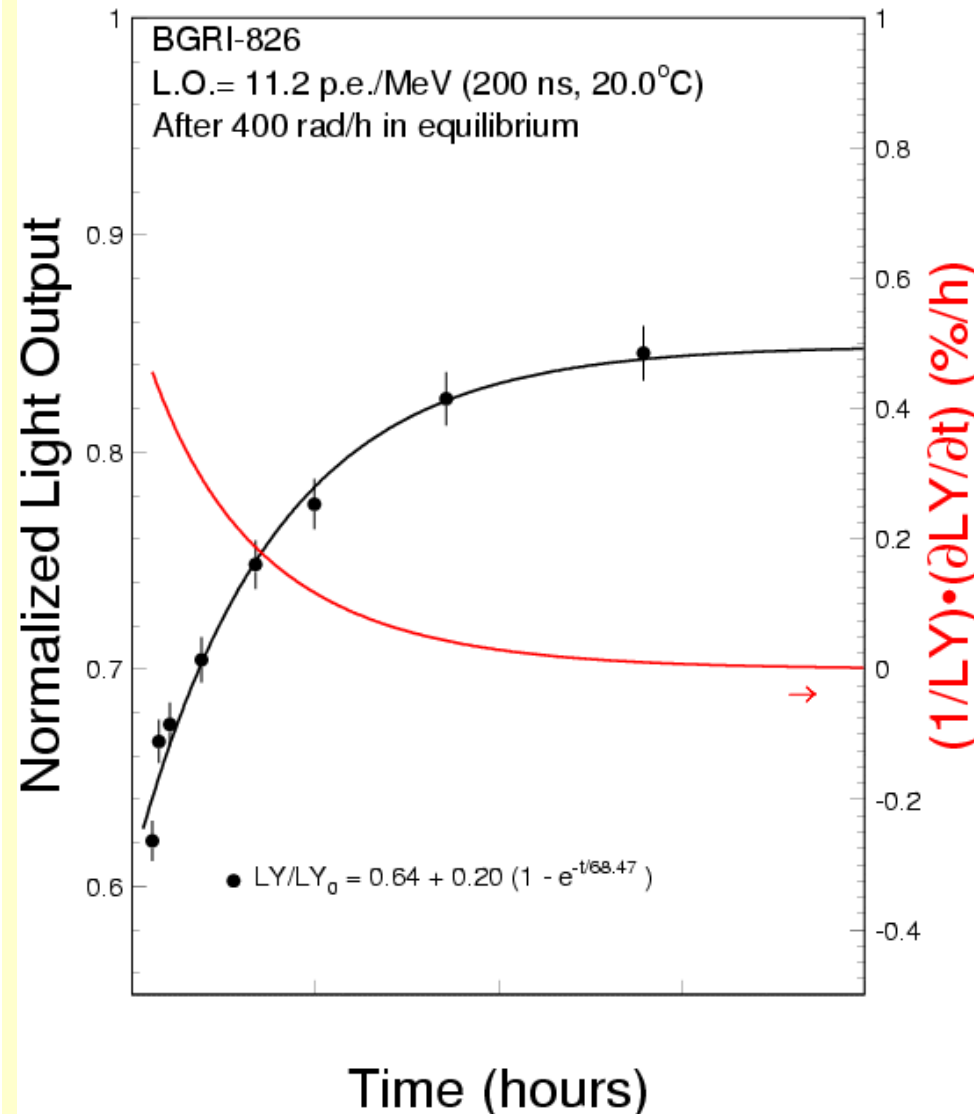
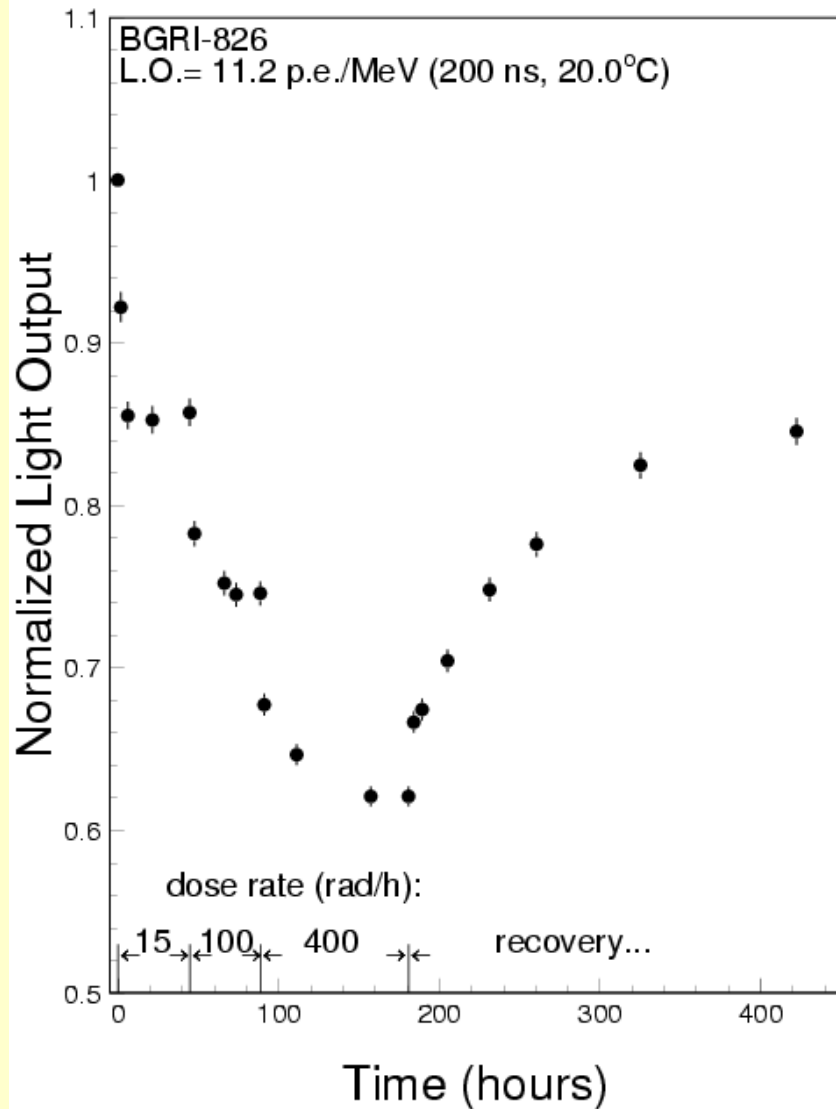
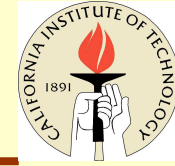


BGRI-824 Damage Recovery



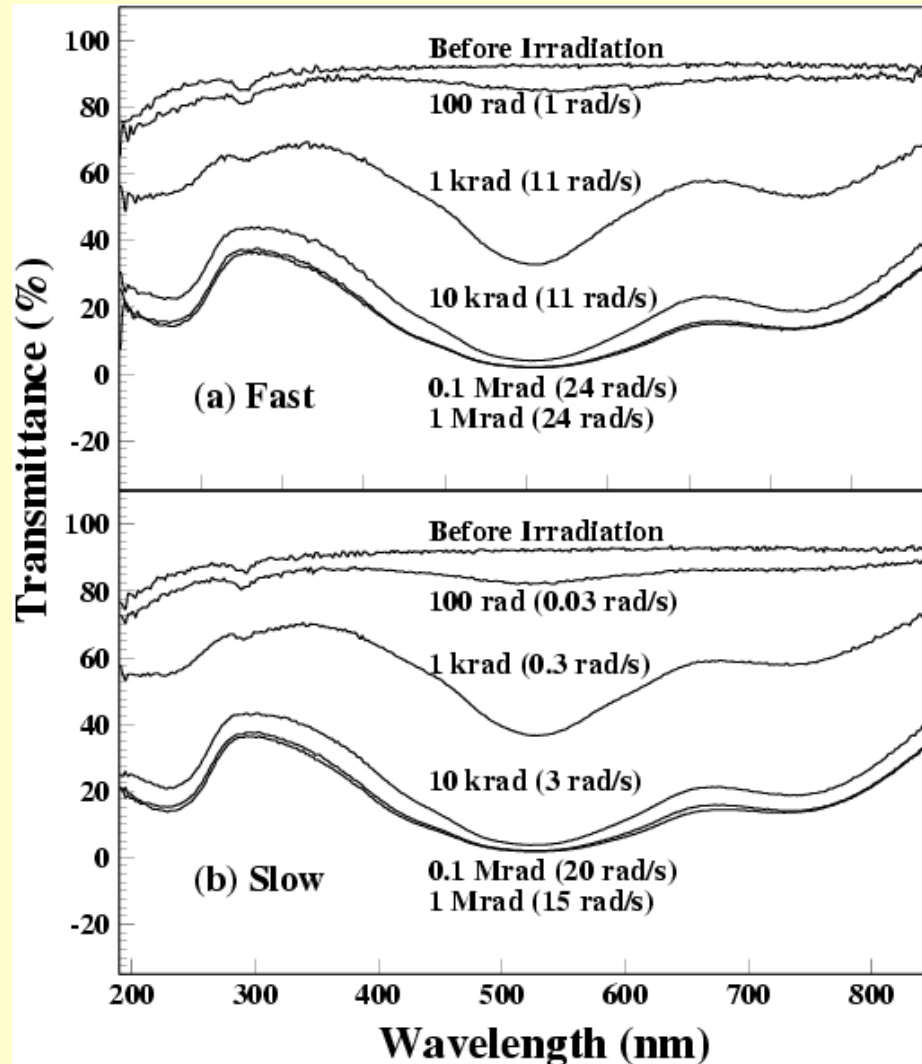
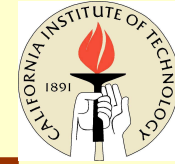


BGRI-826 Damage Recovery





BaF₂ No Dose Rate Dependence

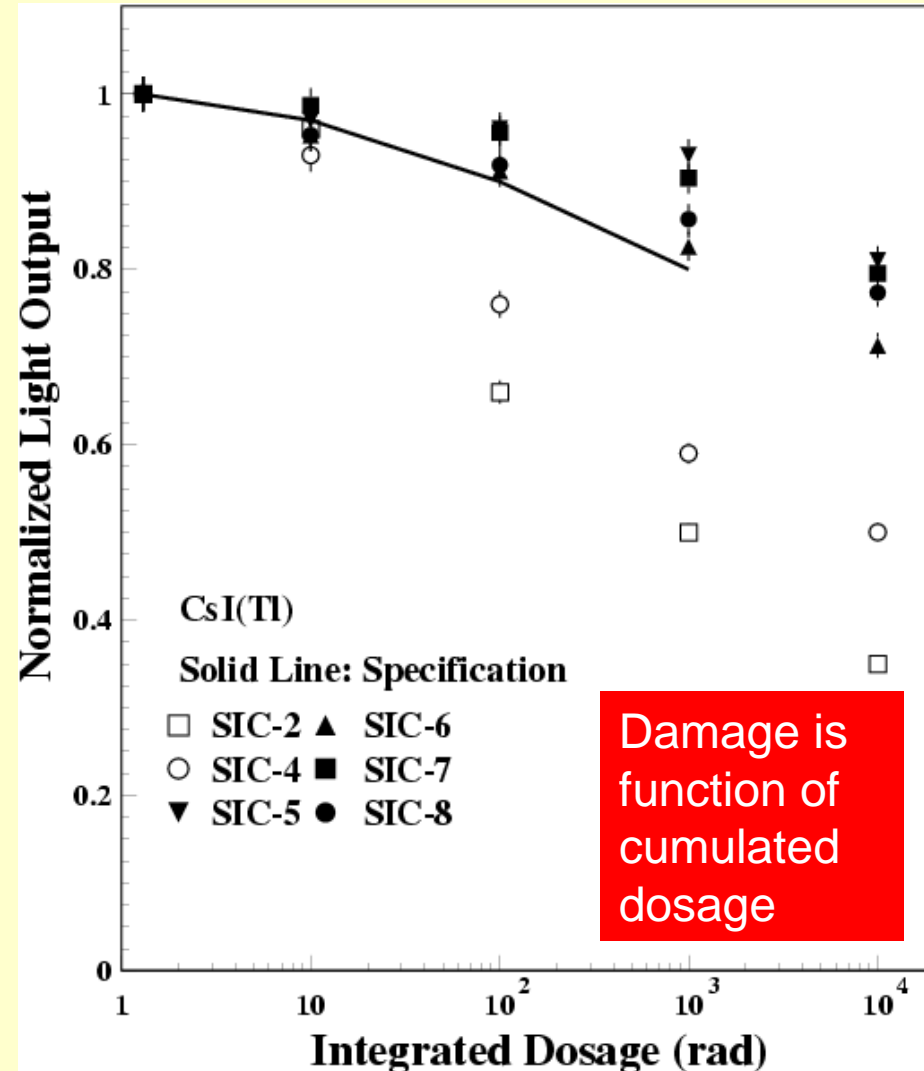
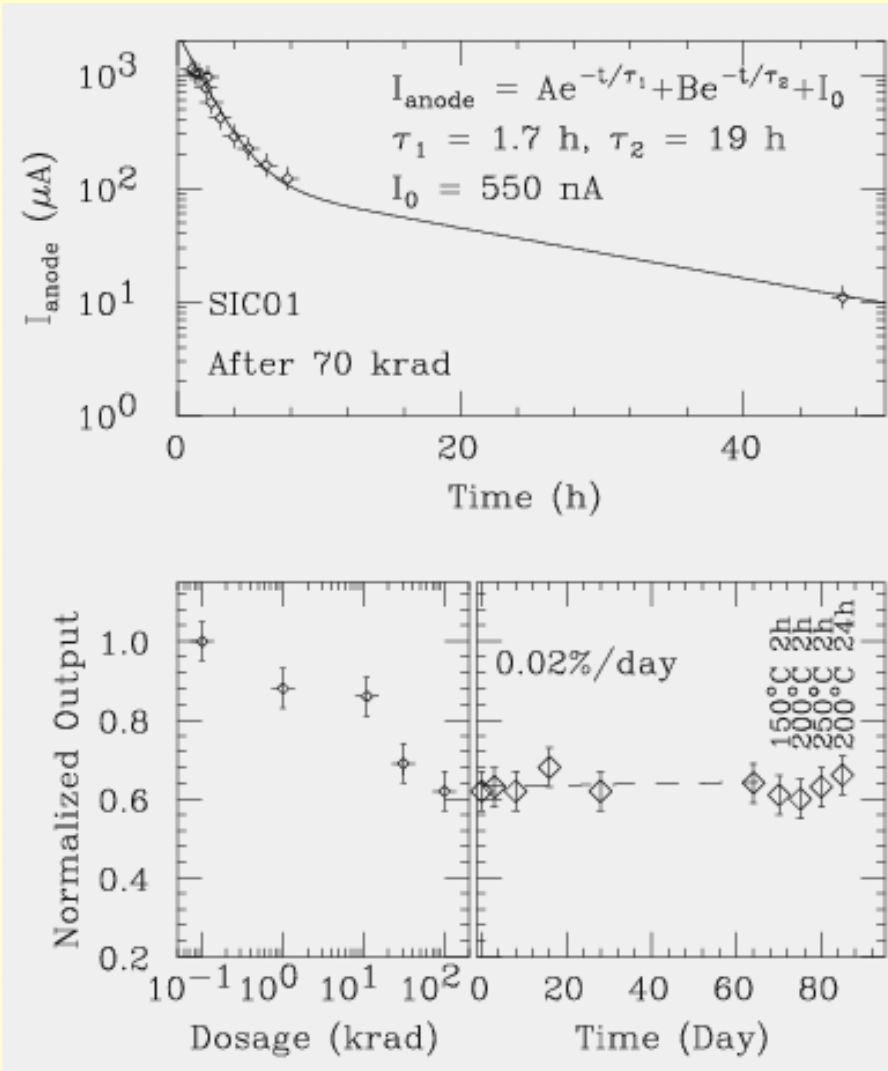
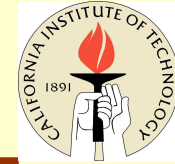


BaF₂ damage does not recover under the room temperature.

Two sets of radiation data with the same cumulated dosage but up to 30 times different dose rate yield the same result.

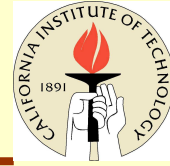


CsI(Tl) Damage No Recovery





Proposed Test Procedure



Co-60 irradiation: in steps of different dose rates, e.g. 15 and 500 rad/h for the damage level in the equilibrium and corresponding recovery. **For those crystals with no recovery, irradiations with cumulated dosage in steps, e.g. 10k, 100k, 1M and 10M rads.**

The same for hadrons irradiation: see if hadrons cause the no recovery observed in the IHEP data. If yes, do hadron irradiation in steps from typical hadron dosage at barrel to the cumulated dosage in ten years for the end caps.