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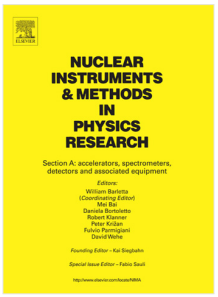

Significant improvement of GAGG: Ce based scintillation detector performance with temperature decrease

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Significant improvement of GAGG:Ce based scintillation detector performance with temperature decrease

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Abstract— This report presents results on the significant improvement of GAGG:Ce based scintillation detector performance with temperature decrease. When temperature of a PMT based detector is lowered to -45^{o}C, its amplitude response at registration of γ-quanta is improved by 30%; FHHM was found to be better up to factor of 0.85, whereas scintillation kinetics become even faster in crystals co-doped with magnesium and magnesium and titanium. All this opens an opportunity for a wide application of GAGG scintillation detectors, particularly in a combination with SiPM photo-sensors, which signal-to-noise ratio would also improve with temperature decrease.

Index Terms—Inorganic scintillation material, GAGG scintillator, γ-quanta, photo-sensor

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