

# **ACCELERATOR SEMINAR**

## **“Recent Topics in Optical Monitor Development in the KEK”**

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I will talk about two recent topics in the Optical monitor development at KEK. (1) Improvement of resolution of the SR interferometer by using unbalanced input. (2) Optical beam halo monitor.

(1) The improvement of resolution of the SR interferometer is to extend ordinal resolution limit of 5 $\mu$ m by normal set up of reflective SR interferometer down to 3-2 $\mu$ m by using unbalanced input for double slit of the interferometer. In the small beam size measurement in few micron range, the resolution of the SR interferometer will saturate beyond 5 $\mu$ m due to background of CCD camera. In the SR interferometer, intensities for each double slit  $I_1$  and  $I_2$  influence to visibility of interference fringe

through the factor of  $2 \frac{\sqrt{I_1 \cdot I_2}}{I_1 + I_2}$ . This factor is always smaller than 1 when  $I_1$  and  $I_2$  are not equal. So, we can escape from background problem by intentional use of condition of  $I_1 \neq I_2$ . By using this technique, we can extend the resolution of beam size measurement down to 3-2 $\mu$ m.

(2) The optical beam halo monitor includes a coronagraph application to beam halo observation by the use of SR. The coronagraph is very special telescope which can make an artificial eclipse for the observation of the sun corona. By applying this special telescope, we can observe beam halo image escape from central glare of beam image. We can observe beam halo which intensity range of  $10^{-6}$ - $10^{-7}$  of peak intensity. This topic also includes OTR beam halo monitor development for J-PARC. The beam halo diagnostics is extremely important in the high intensity proton machine such as J-PARC. Idea to observe beam halo is using OTR screen with hole. Main part of the high intensity proton beam will pass through the hole in the OTR Screen, and surrounding beam halo only produce OTR. This idea can work as ideal coronagraph.

**Thursday, November 10, 2011**

**11:00 a.m.**

**CEBAF Center, Room L102/104**

**Coffee before seminar at 10:45 a.m.**