# Beam Backgrounds at a SuperB Factory

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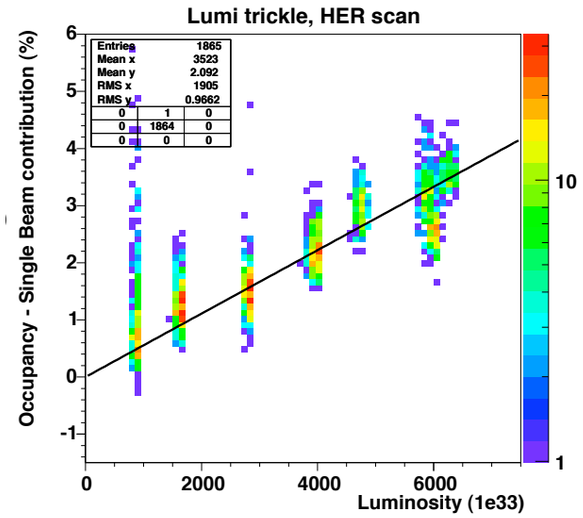
# Beam Background Sources

## Extrapolate from PEP-II  look at DCH backgrounds

$$\text{Occupancy}(\%) = 0.61 + 0.17\ I_{LER} + 3.97\ I_{HER} + 0.42\ \mathcal{L}$$
$$+0.21\ I_{LER}\ (\text{beam} - \text{beam}) + 0.03\ \mathcal{L}\ (\text{trickle injection})$$

Cristinziani, Hawaii workshop

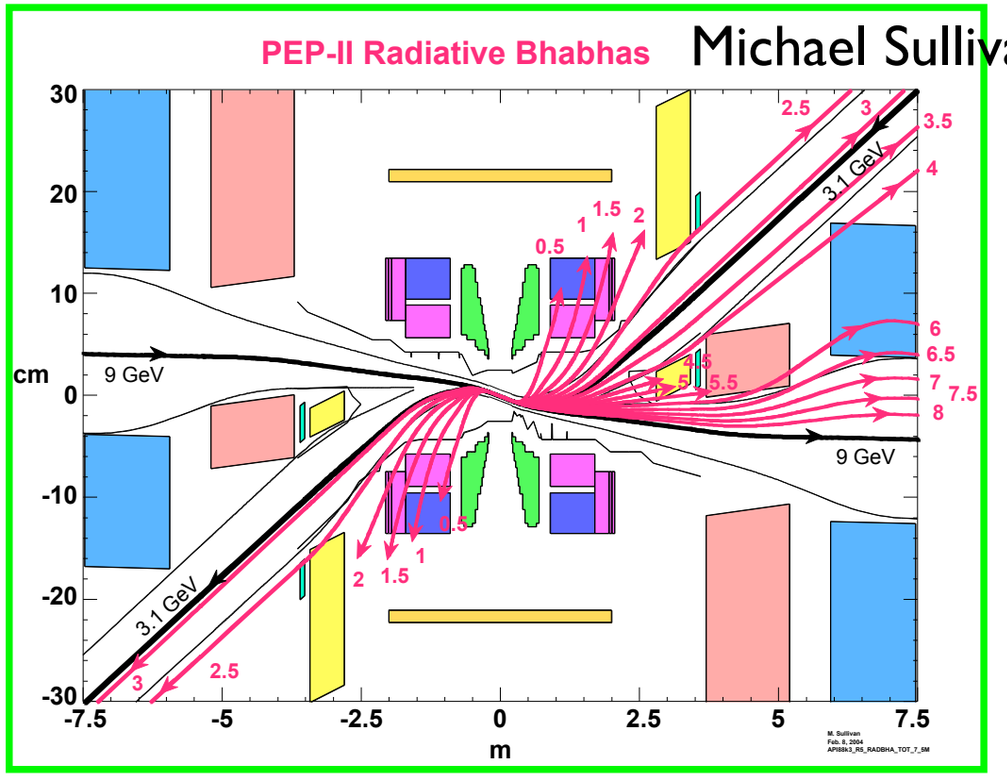



Using $I_{LER}$ = 1.0 A  $I_{HER}$=1.0 A  L=$10^{36}$ implies a DCH Occupancy of 400%, all from Luminosity

## Luminosity Backgrounds at PEP-II

IP Bends put Radiative Bhabhas into the magnets - full Geant simulation reproduces Luminosity Background to within a factor

need to evaluate SuperB IP design

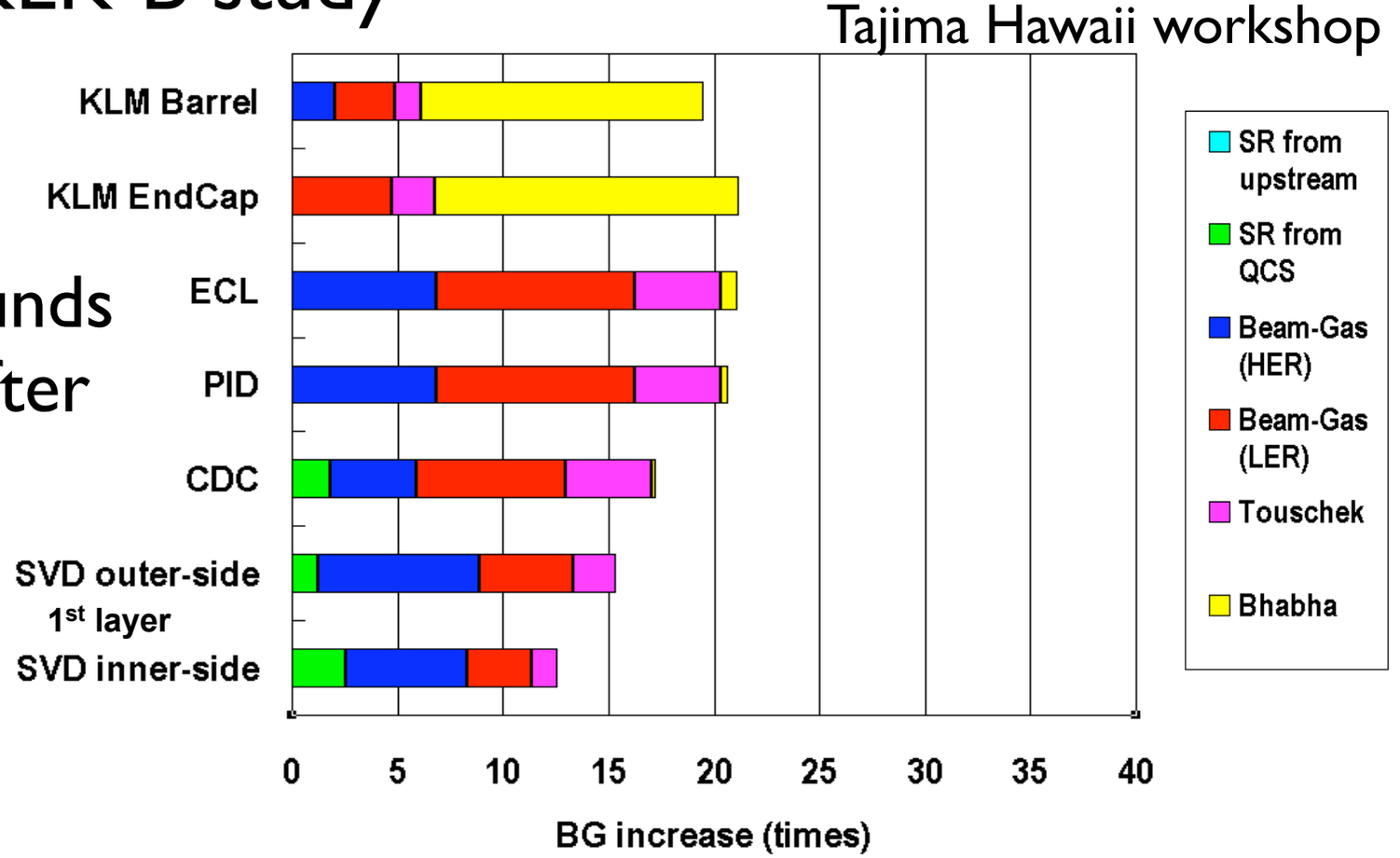


# Beam Background Sources

## Extrapolate from Super KEK-B study

$I_{LER}$ = 9.4A $I_{HER}$ =4.1 A

Radiative Bhabha backgrounds limited to Muon system, after shielding the calorimeter




## Touschek scattering

Intra-bunch scattering: Linear in bunch volume, quadratic in current

with $\sigma_y$ = 12nm becomes a much more serious issue

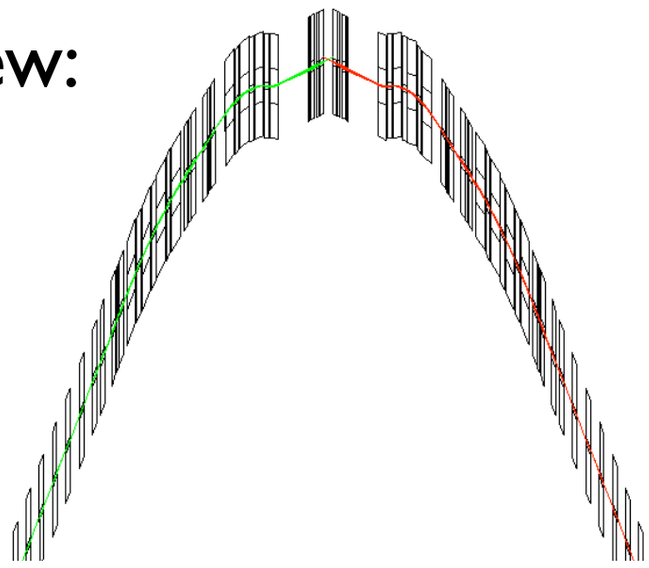
Beam-Gas will not be as large at SuperB, with lower Beam currents

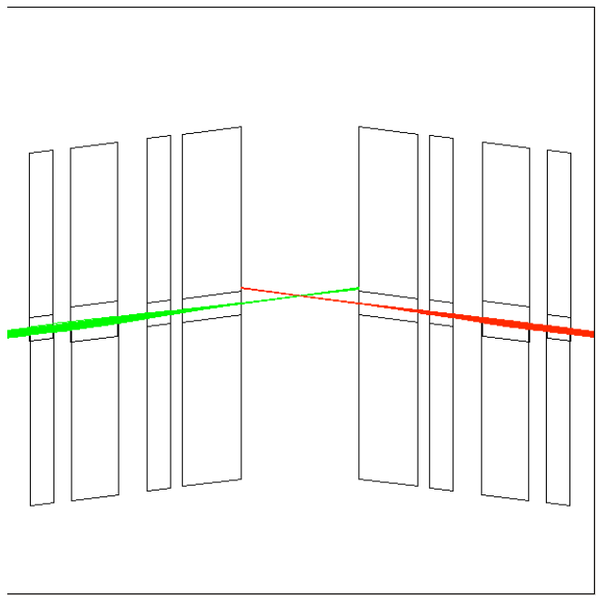
# Estimating Backgrounds at SuperB

Andrei Seryi - scaled ILC final focus design to SuperB energy
Takashi Maruyama - converted MAD deck to GEANT model of IP

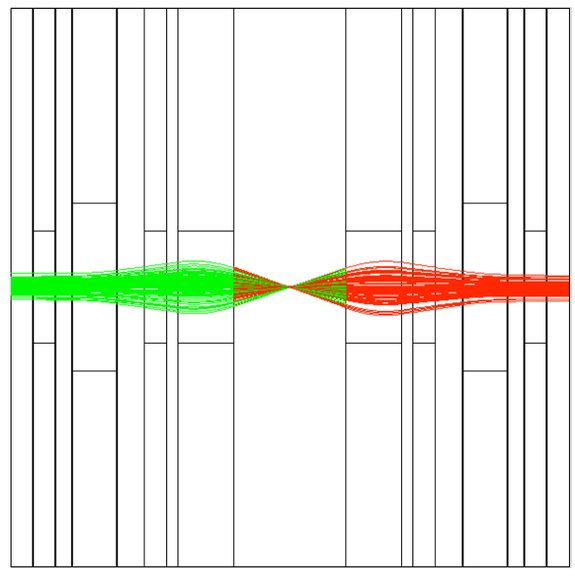
## GEANT model of IP

x view:





y:



develop tools to study SuperB backgrounds
start with Radiative Bhabha and Touschek sources
of background from the IP model
feed into current BABAR/PEP-II GEANT model
(modify permanent magnets to superconducting)