Comments on updated baseline EMMA lattice

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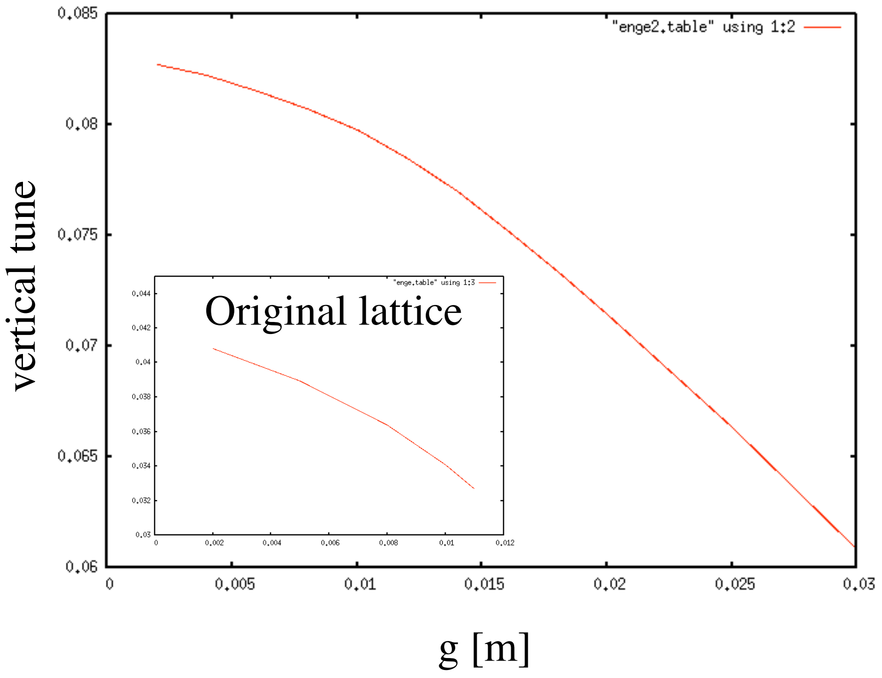
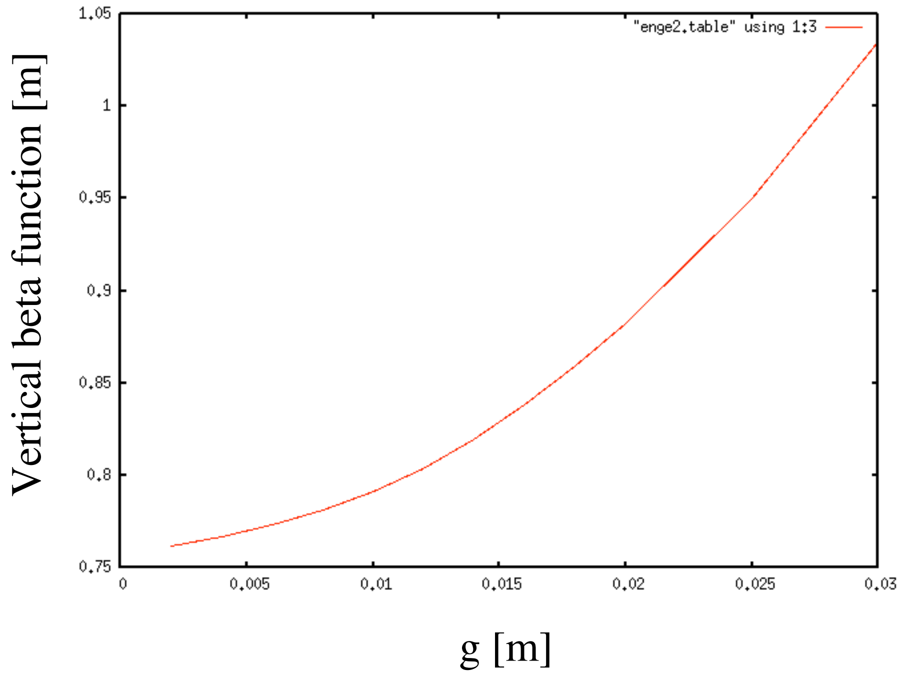
http://hadron.kek.jp/~machida/doc/nufact/ffag/machida_20060322.ppt & pdf

ν_y and β_y vs. *g* (scaling parameter of the order of gap)





Beam size increases 10-15% when g=20-30 mm.

Analytical modeling for non-scaling magnet

- Assume shifted quadrupole
  - Soft edge model with Enge type fall off.
  - Scalar potential in cylindrical coordinates.

$$P_2(r,\theta,z) = \frac{r^2 \sin 2\theta}{2}\left[G_{2,0}(z) + G_{2,2}(z)r^2 + \cdots\right]$$

where

$$G_{2,2k}(z) = (-1)^k \frac{2}{4^k k!(2+k)!}\frac{d^{2k}G_{2,0}(z)}{dz^{2k}}$$

and

$$G_{2,0}(z) = \frac{G_0}{1+\exp\left(\sum_{i=0}^{5} C_i z^i\right)} \qquad z = \frac{s}{g}$$

s: distance from hard edge.

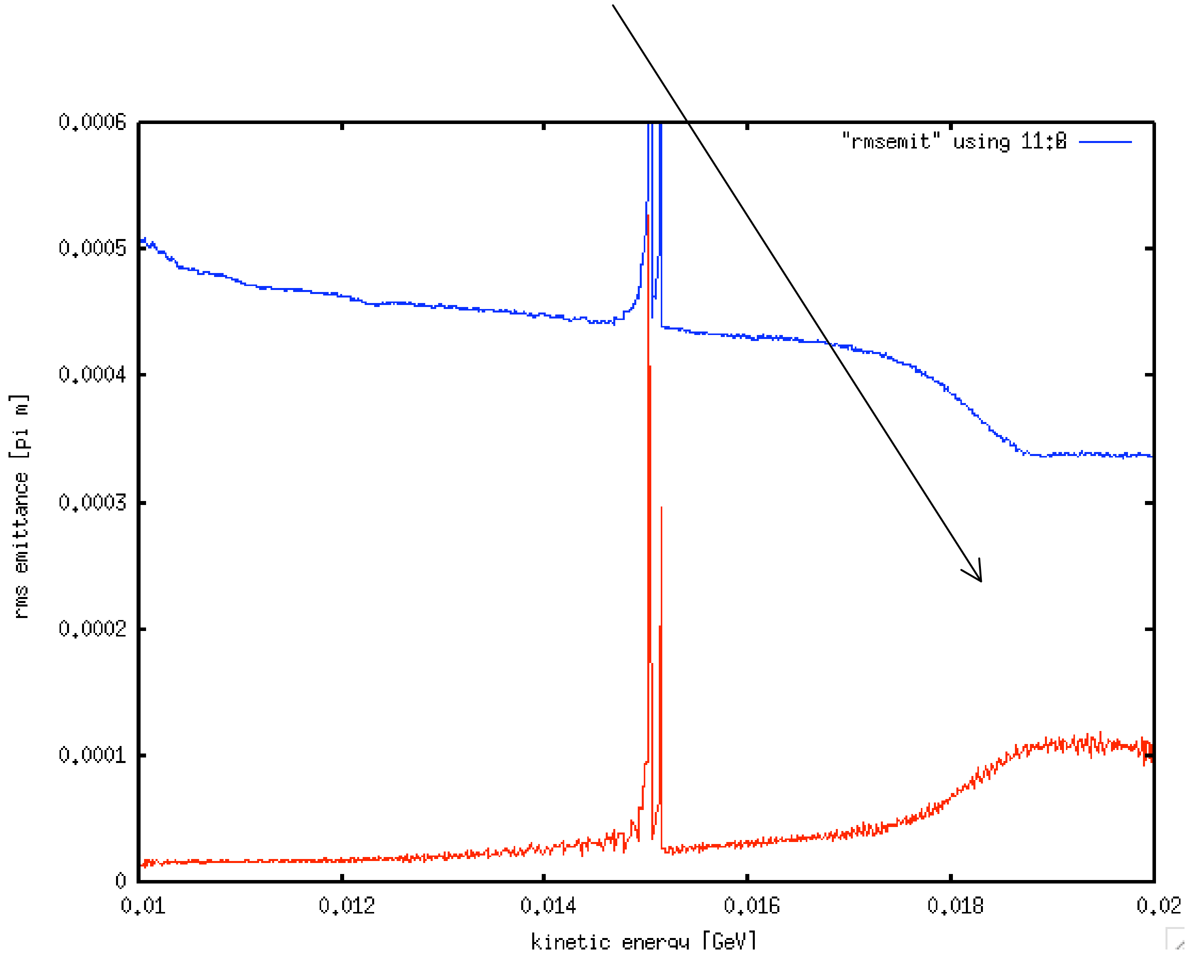
g: scaling parameter of the order of gap.

C_i: Enge coefficient.

Parameters for updated EMMA lattice

- Take G_{20} and G_{21} only.
- Enge coefficient (“nominal” value)
  - c_0 = 0.1455
  - c_1 = 2.2670
  - c_2 =-0.6395
  - c_3 = 1.1558
  - c_4 = c5 = 0

Crossing of ν_x-$2\nu_y$=0



Coupling is visible just before the final energy
(red: horizontal (0 π mm), blue: vertical (3 π mm)).