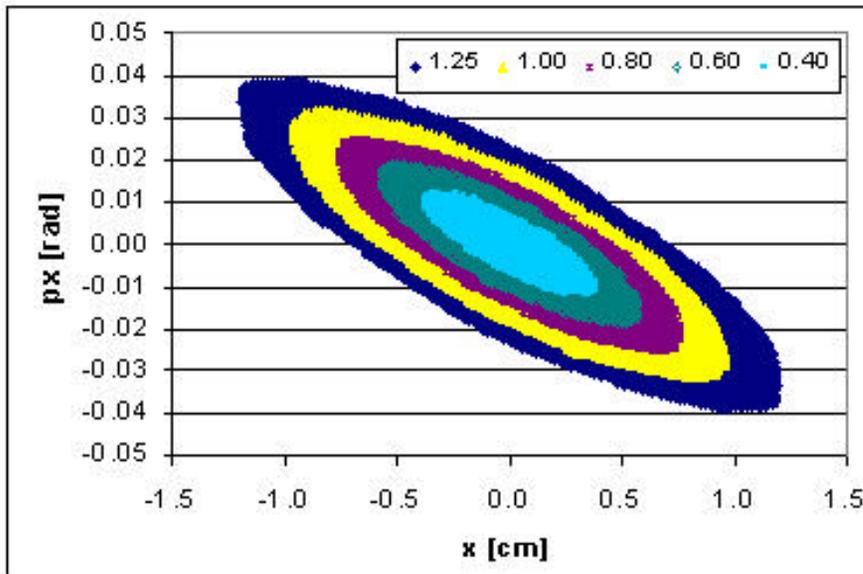


Preliminary study of DTL scrapers

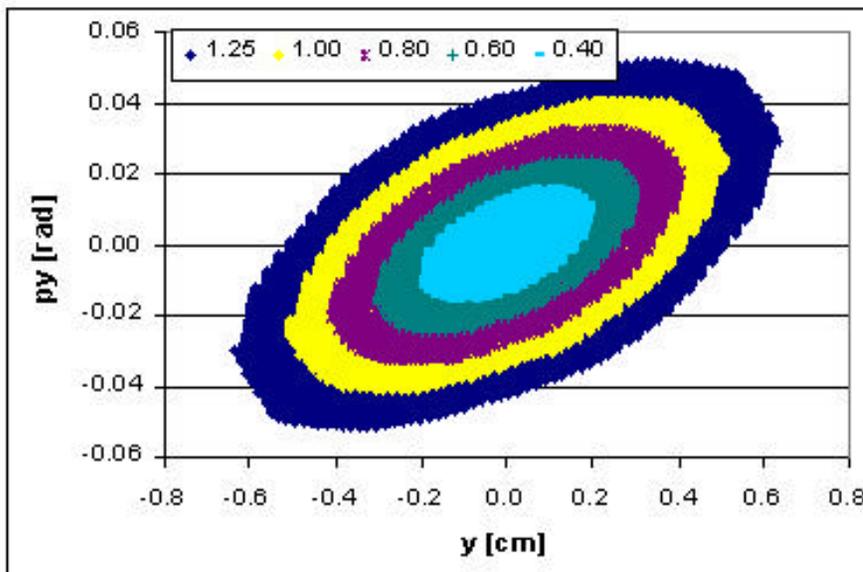
Dong-o Jeon

Jim Stovall

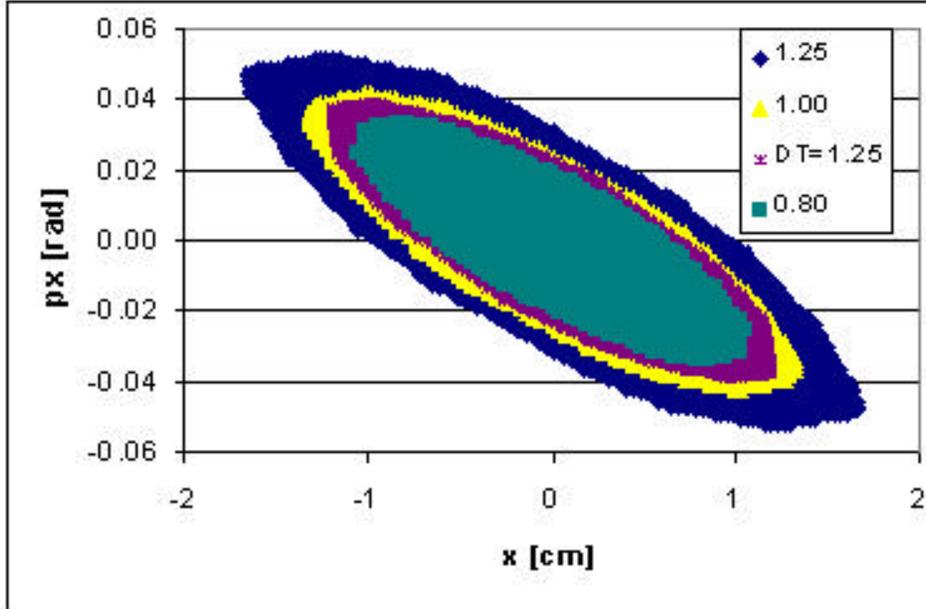
Harunori Takeda



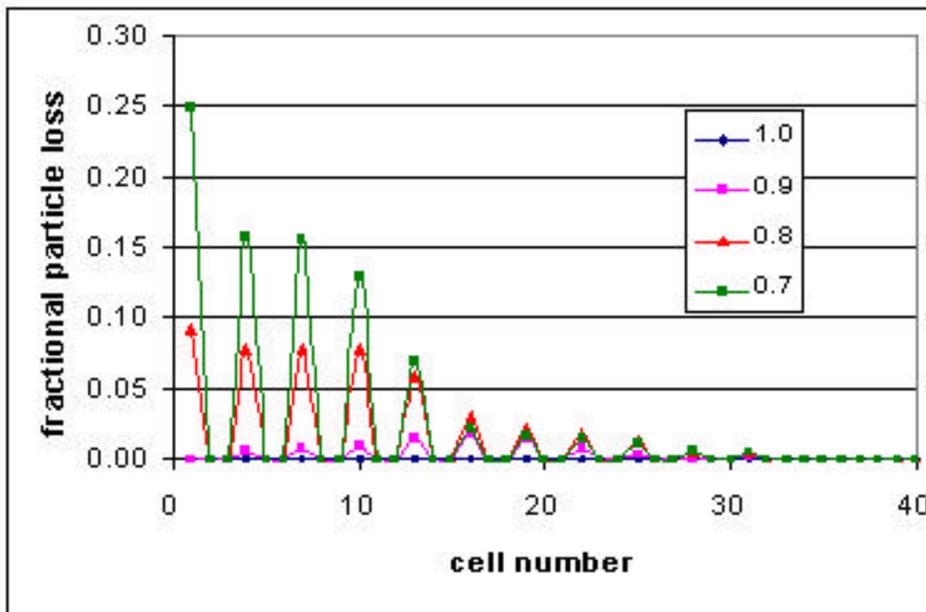
X acceptance of DTL tank 1
defined by all drift tubes



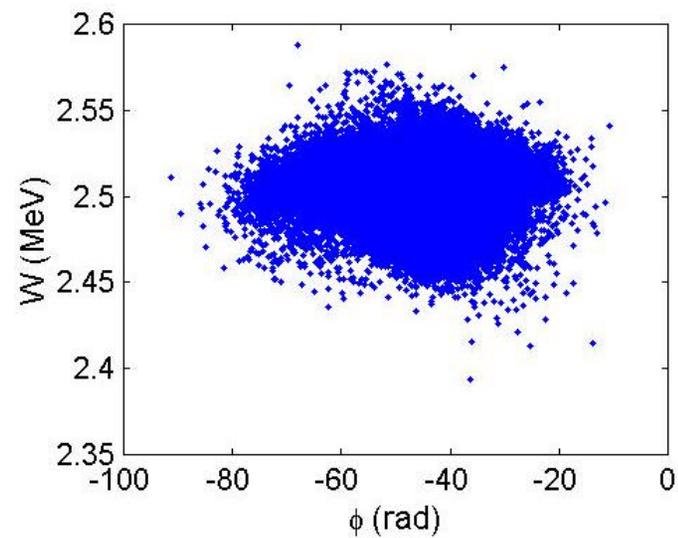
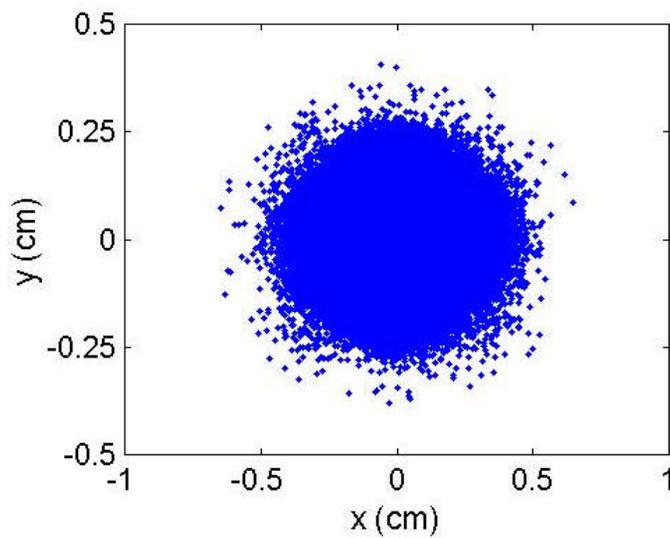
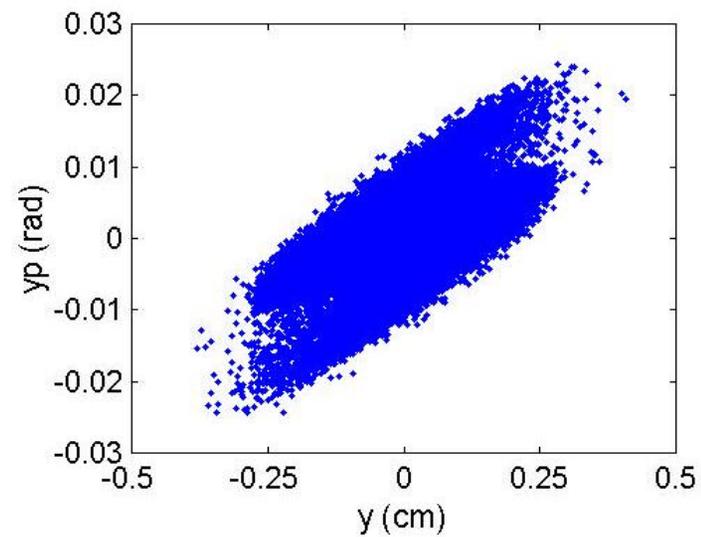
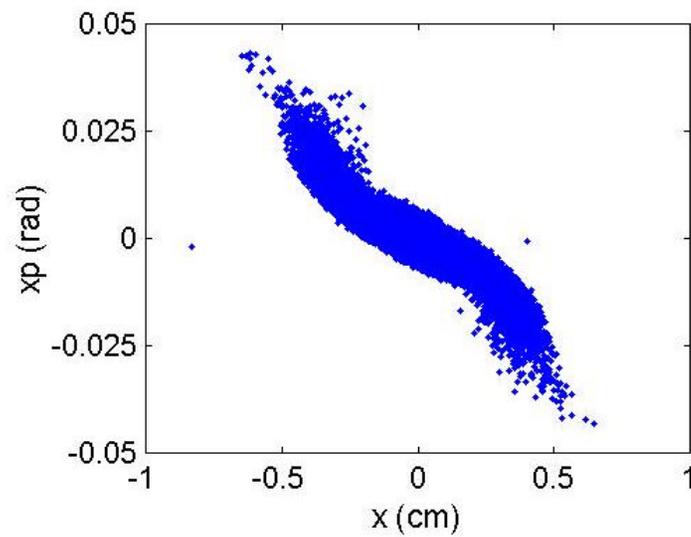
Y acceptance defined by all drift
tubes



Acceptance defined by apertures at empty drift tubes

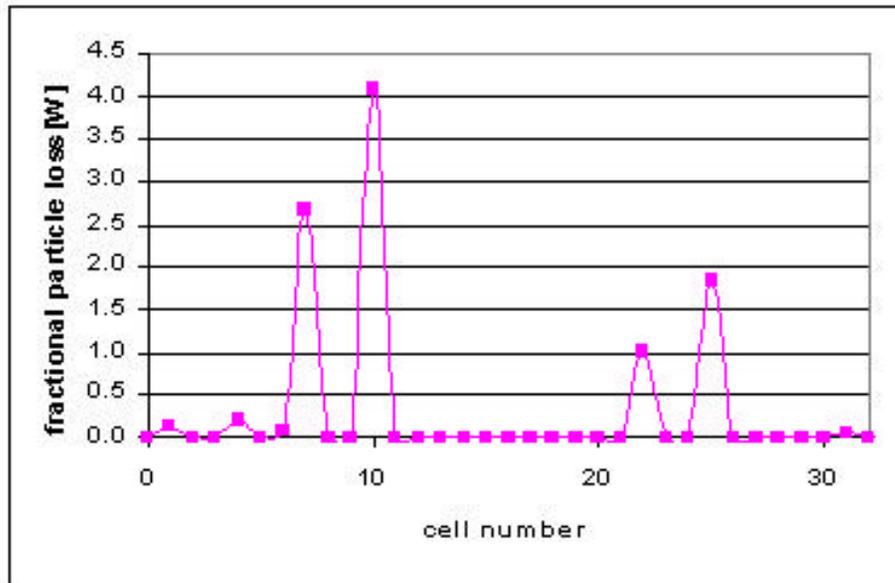


Fractional particle loss by scrapers in empty drift tubes

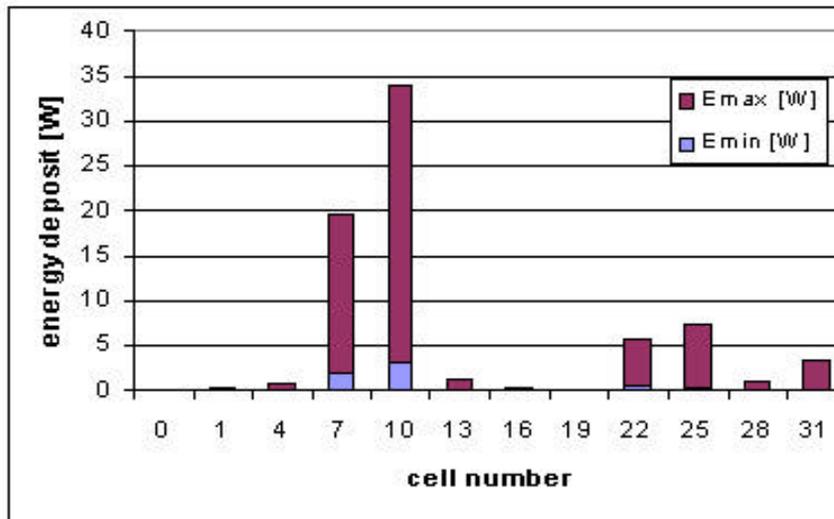


Beam distribution at the entrance to DTL tank 1

When $r=8\text{mm}$ apertures are placed at empty drift tubes



Energy deposit to apertures for a nominal case without imperfections



Energy deposit to apertures for 100 linacs with imperfections.

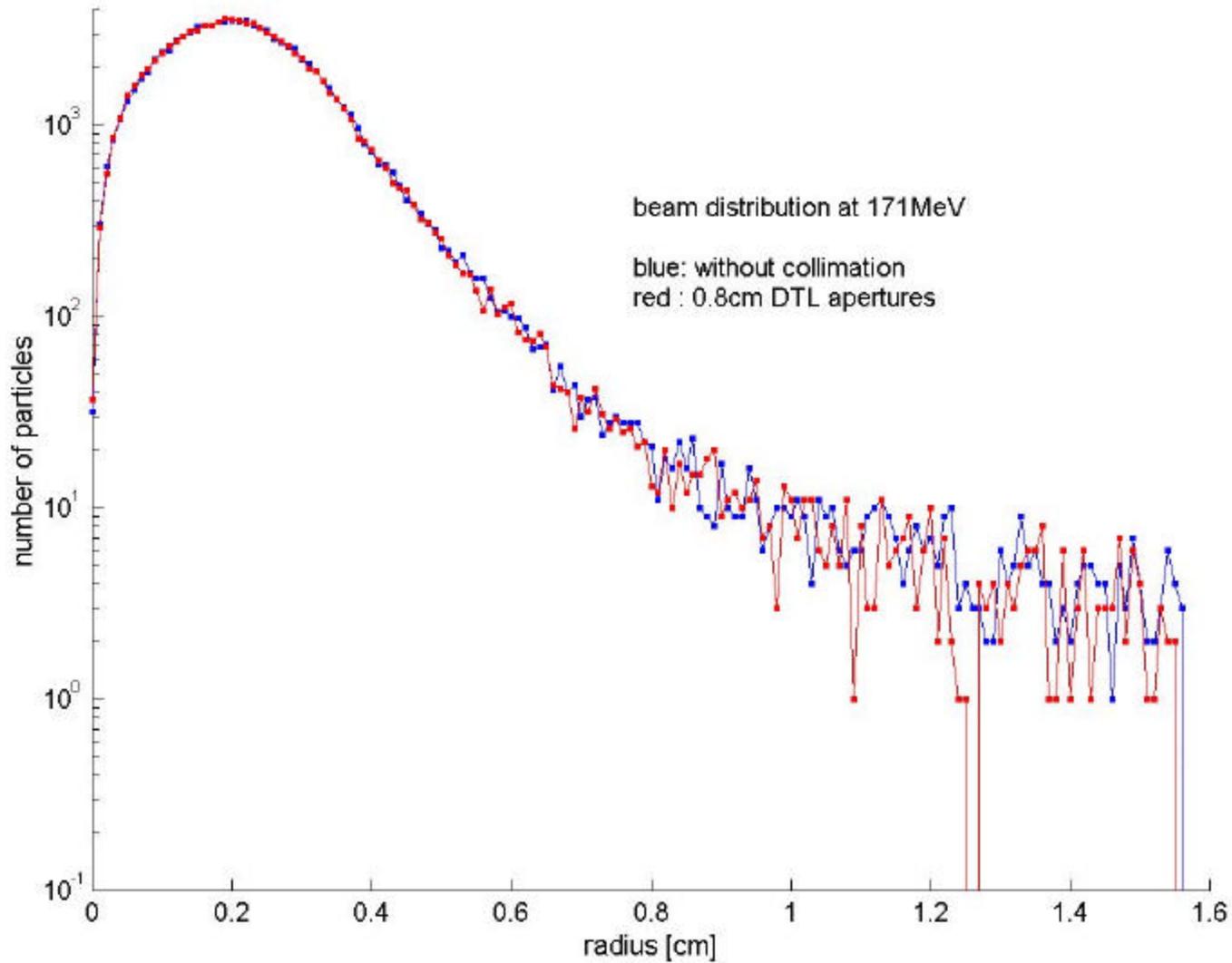
Quads:

$dx=5\text{mil}$, $dy=5\text{mil}$, $\text{roll}=5\text{ mrad}$
 pitch , $\text{yaw}=10\text{ mrad}$, $\Delta K=1.7\%$

RF:

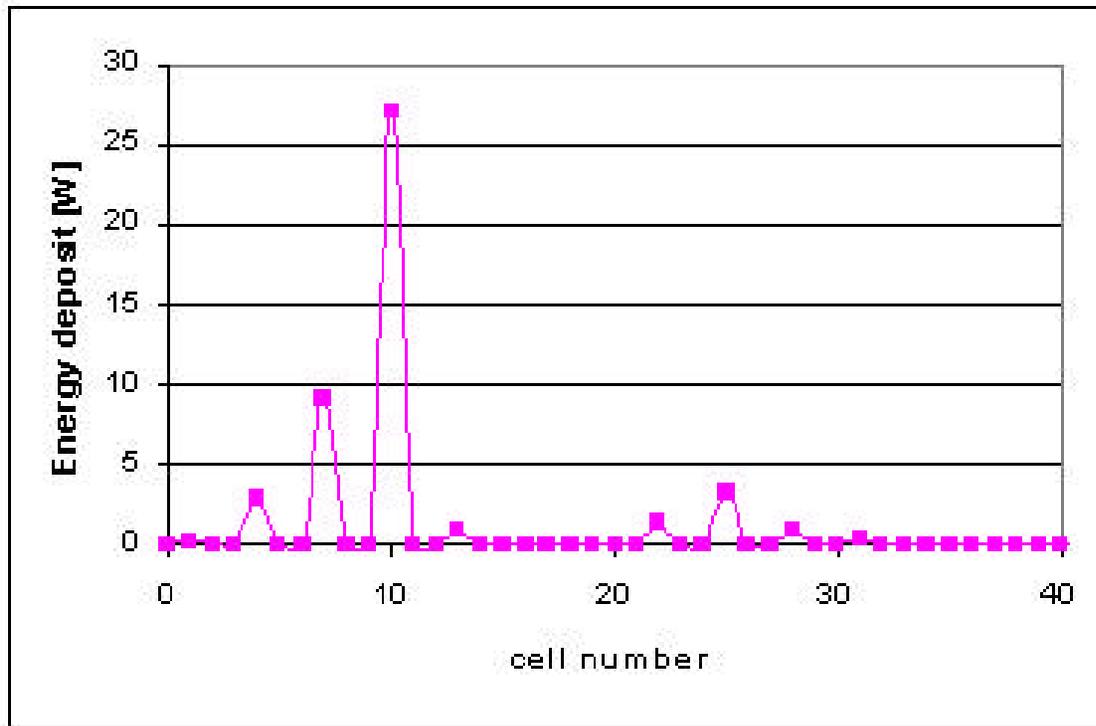
$\Delta A=0.5\%$, $\Delta\phi=0.5^\circ$

8mm DTL scrapers do not improve halo at CCL



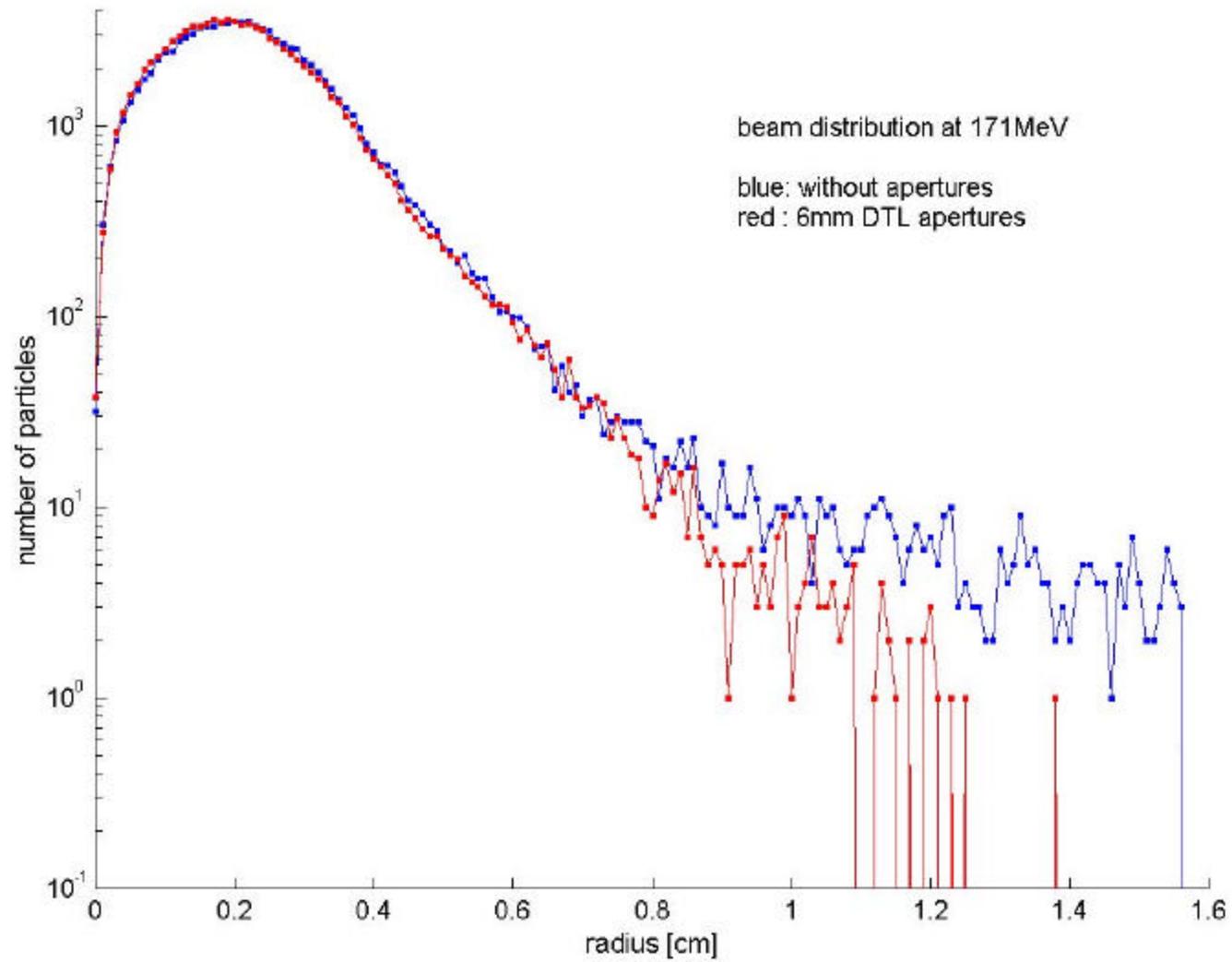
Beam distribution at 171MeV

When $r=6\text{mm}$ apertures are placed at empty drift tubes



Nominal energy deposit to apertures without imperfections

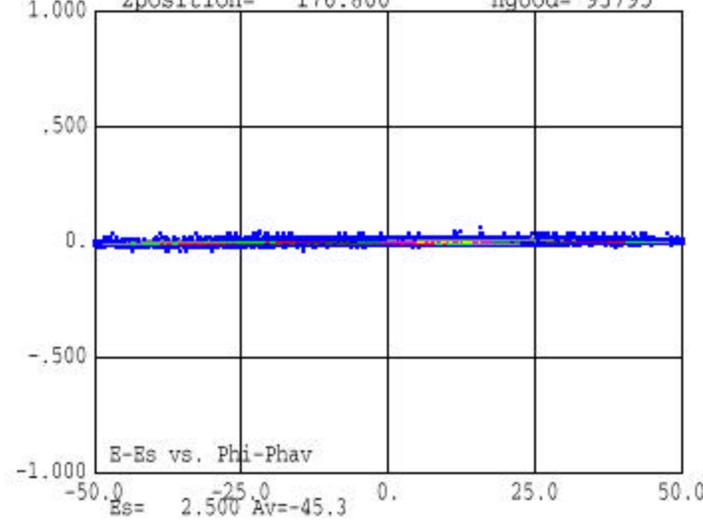
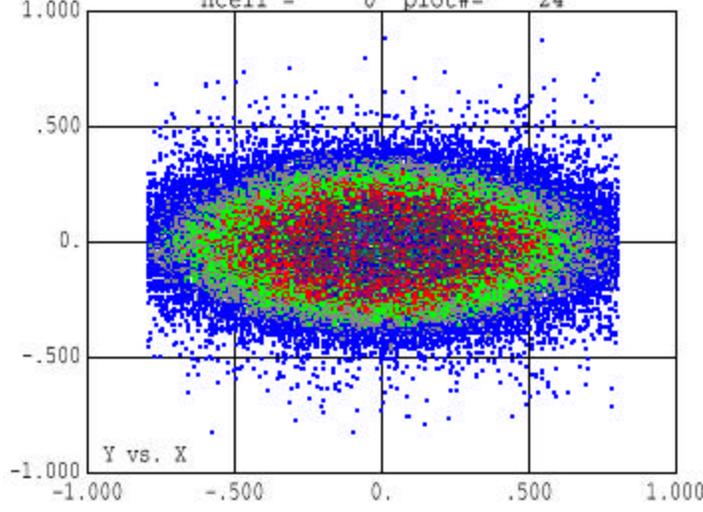
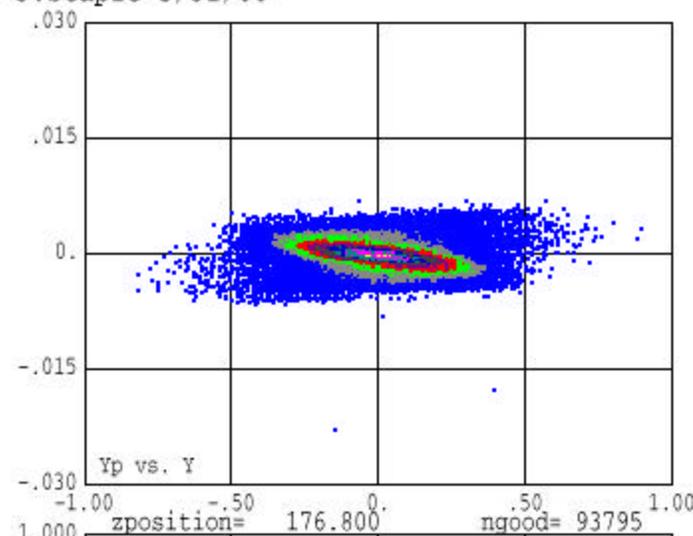
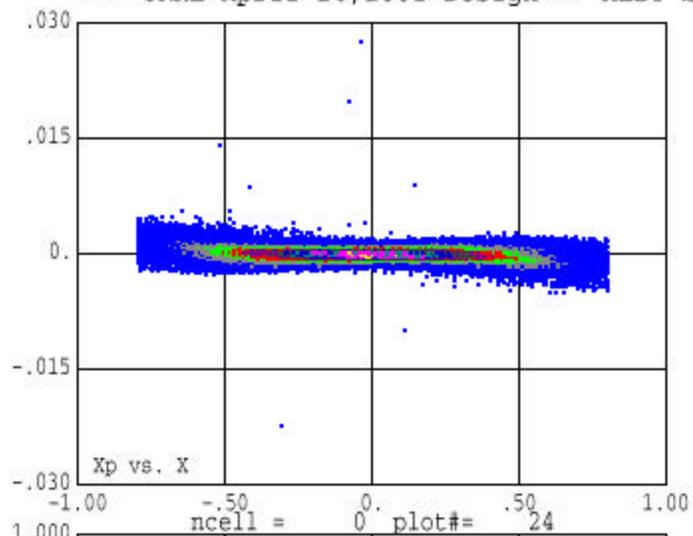
6mm DTL apertures improve halo at CCL



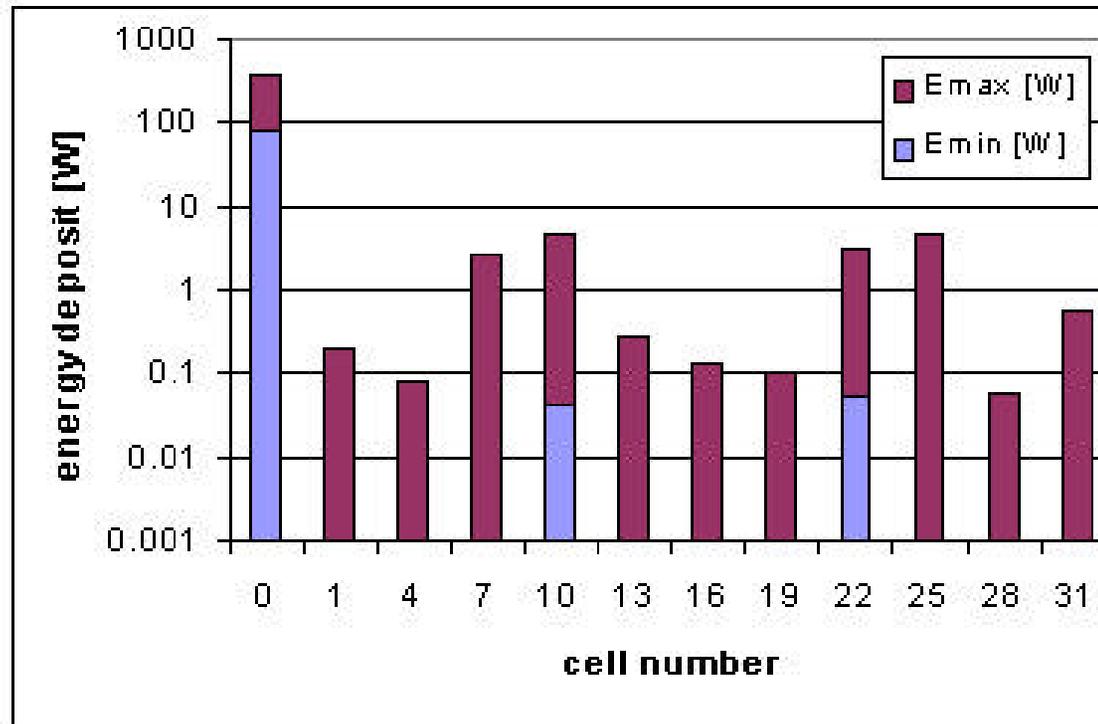
Beam distribution at 171MeV

- There are no dipole steerers in the proposed aperture locations in DTL tank 1.
- Lack of flexibility to machine imperfections.
- Depending on imperfections, energy deposit to a certain apertures can be as high as ten times of nominal values.
- Tail of the scraped beam distribution at 171MeV is not much improved for 8mm apertures compared with the case without scraping.
- Heat load is a potential problem for 6mm apertures.

*** ORNL April 26,2001 Design*** MEBT by J.Staple 5/31/00

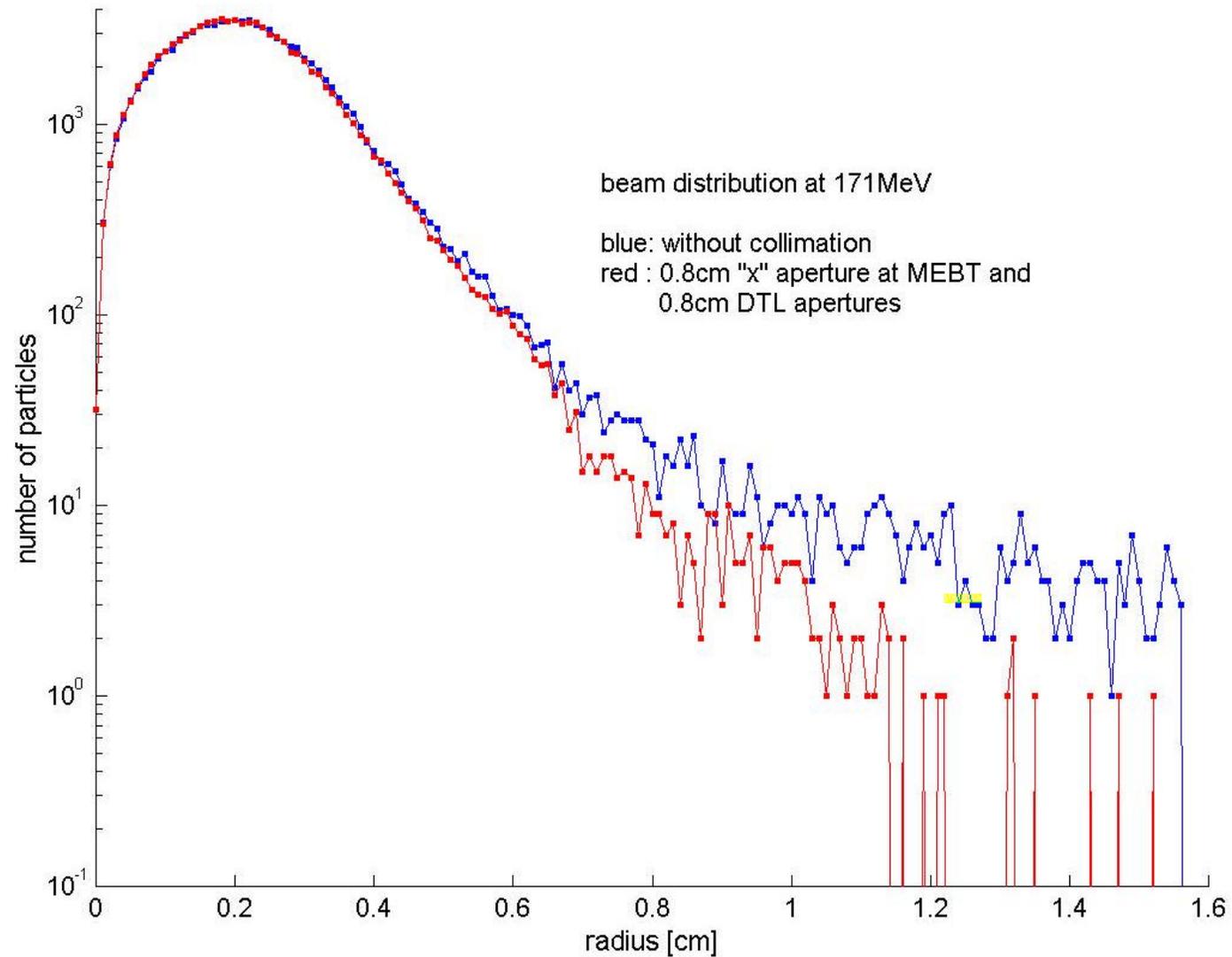


With a 8mm x aperture at MEBT (chopper target)



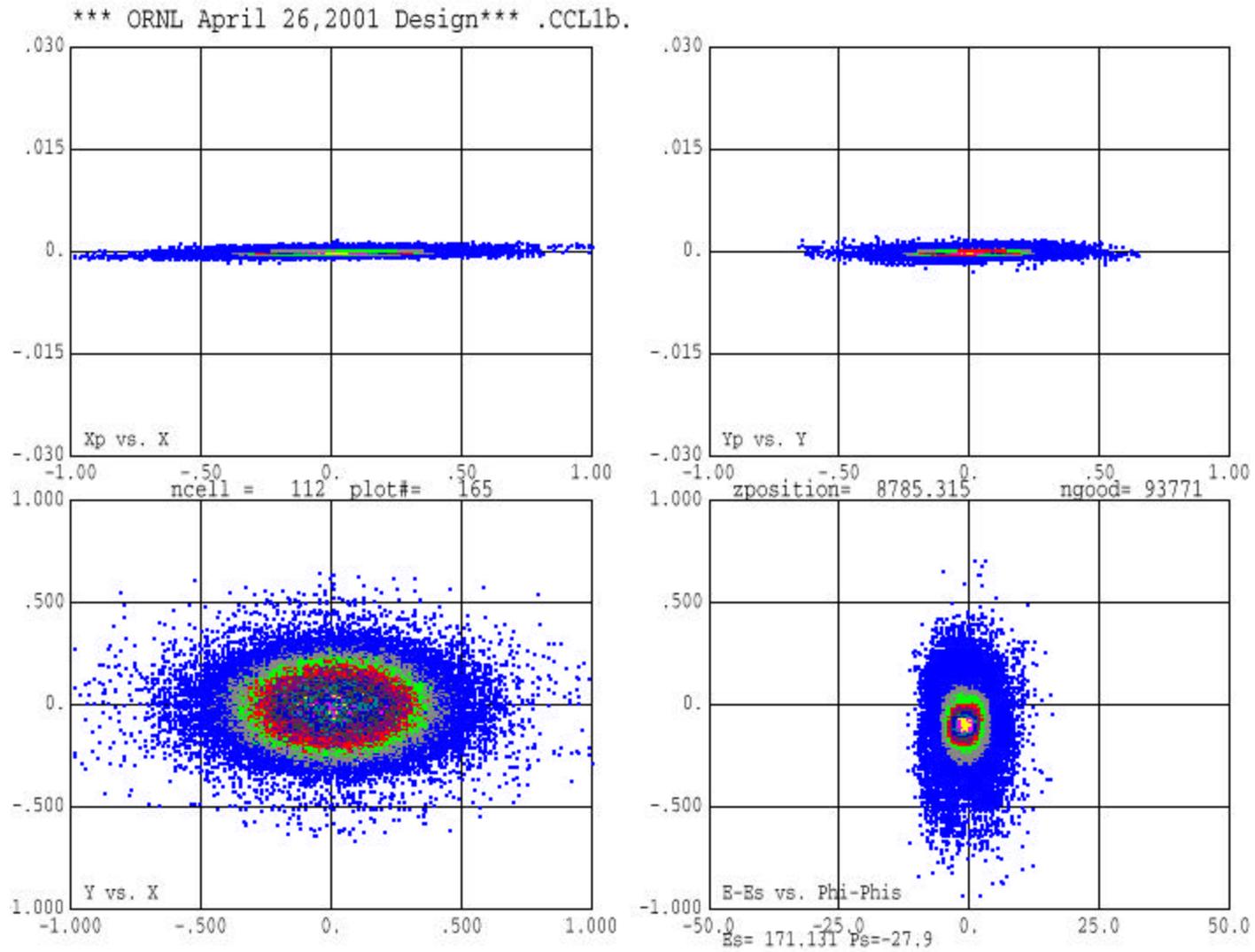
Energy deposit to apertures for 100 linacs

MEBT scraper improves halo at CCL

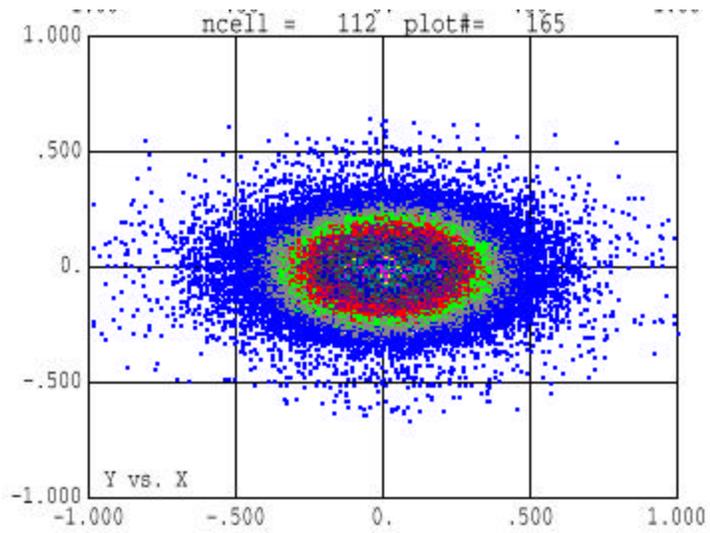


Beam distribution at 171MeV

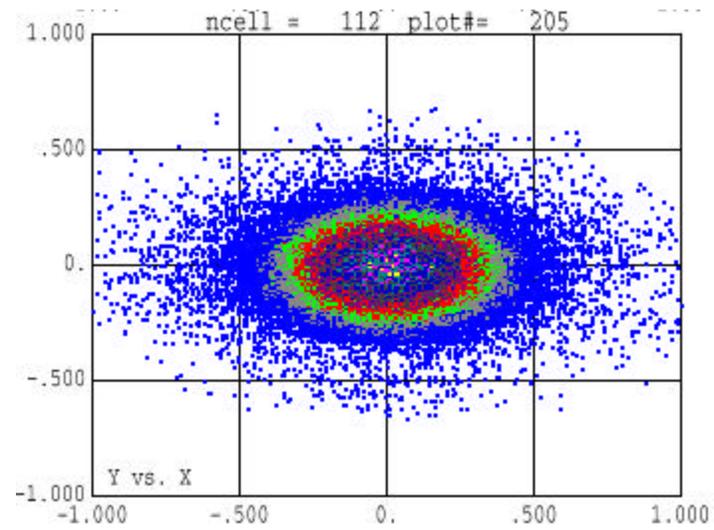
With MEBT aperture + 8mm DTL apertures



Beam distributions at 171MeV



MEBT aperture +
8mm DTL apertures



8mm DTL apertures

