17TH ADVANCED BEAM DYNAMICS WORKSHOP ON
FUTURE LIGHT SOURCES

Very Low Emittance Storage Rings

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VERY-LOW-EMITTANCE SR's

S. KHAN 8-4-99
BESSY

- ANY **NEW** STORAGE RING BASED LIGHT SOURCE SHOULD HAVE SMALLER ($\sim 10^2$) HOR. EMITTANCE. (+ HIGHER CURRENT?)
- NO NEED TO REDUCE THE VERT. EMITTANCE (DIFFR. LIMIT)

  - 10^2 MORE BRIGHTNESS (AVERAGE)
  - 10 LESS x' (TOUSCHEK ↘)
  - 10 LESS x (CHECK INTRABEAM SCATTERING)

→ BY $\varepsilon_x \sim \theta^3$, NEED 4-5 x MORE {ACHROMATS}/DIPOLES
(BUT NOT THAT MANY MORE ID's)

MAKE IT SMALLER!

(ONE STEP TOWARDS MAKING IT A PRODUCT FOR INSTITUTES, COMPANIES HOSPITALS, ---)

- USE PERMANENT MAGNETS (CHECK RAD. DAMAGE PROBLEM)
  - EXPERIENCE FROM UNDULATORS, PEP-II INT. REGION, ETC...
  - EXPENSIVE, BUT YOU ECONOMIZE IN
    - LAND
    - BUILDING
    - BEAM PIPE, VACUUM
    - POWER
    - ...
- SIMPLE LATTICE DESIGN
- MAYBE COMB. FUNCTION MAGNETS
- SMALL ID's ? SUPERCOND., RF-UNDULATORS ...

REMARKS

* SOME FLEXIBILITY BY MECH. MOVEMENT + COILS (MOTORS, PIEZO's)
* MAYBE HIGHER RF-FREQ. (2.5 GHz CW AVAILABLE)
* SMALLER VACUUM CHAMBER, CHECK VACUUM ISSUES RES. WALL EFFECT