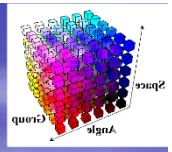
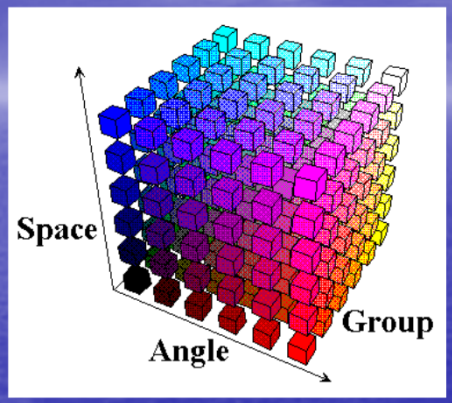
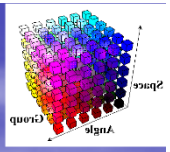




PENTRAN -CRT Problem Exercises

Colorado School of Mines
PENTRAN-CRT Workshop
March 2014

Nuclear and Radiological Engineering Program
George W. Woodruff School of Mechanical Engineering

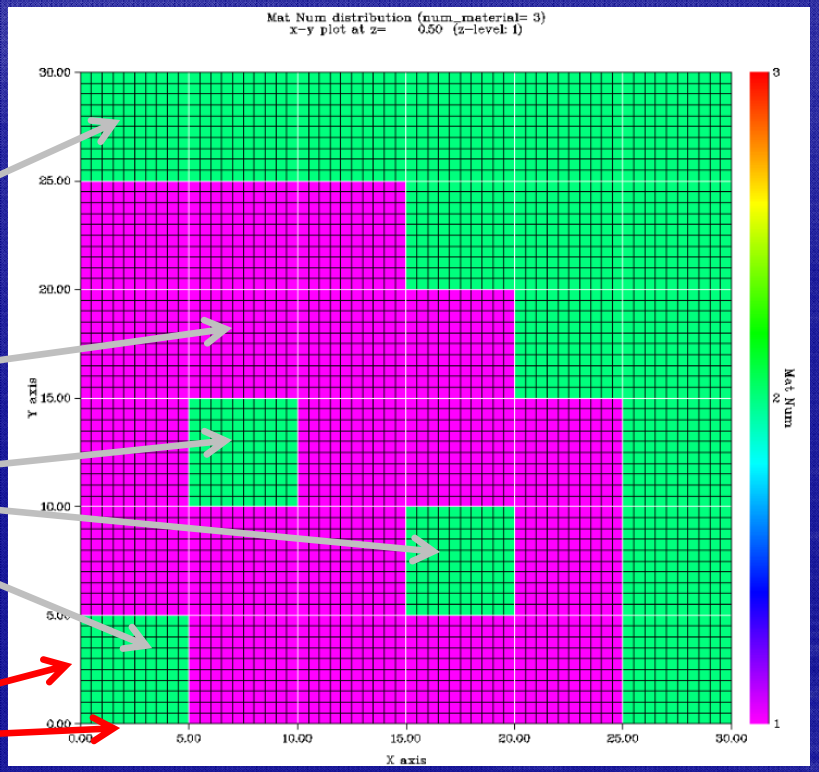


Parallel Job Processing

- **Two Modes for Execution: Interactive or Batch**
  - ***Interactive Mode***
    - Interesting for debug, poor use of system
  - ***Batch Mode in IBM Blue Gene***
    - **"sbatch" Batch** Scheduler by IBM
      - Job "squeue" for **Queue** core use
      - Allocates jobs to least used cores automatically
    - Scripts for pre- and post- **parallel PENTRAN**
      - **mpisub ppencrt prbname pen #n #c, ppen-post prbname pen #n #c**
    - Post processing with **PENDATA**, **PENMSH**

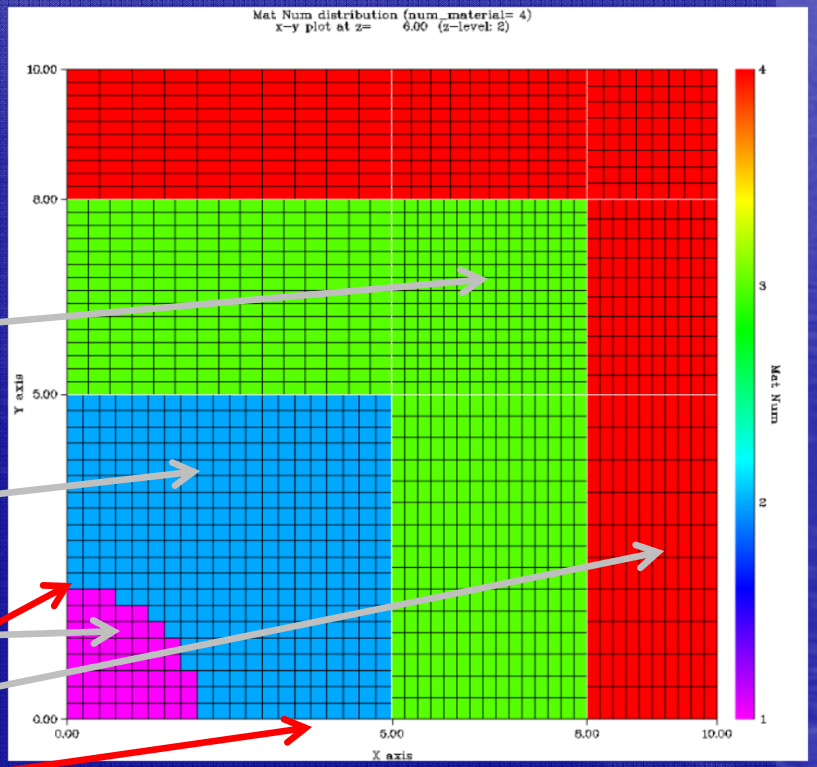
Sample Reactor Problem: zippy

- **Zippy** reactor problem
  - 6x6 Coarse Mesh problem with control rod /water flux traps
    - zippy.pen
    - Water(m2)
    - Fuel (m1)
    - Water or Control Rod (m3)
    - Reflective



Sample Shielding Problem: pbshield

- **pbshield** shielding problem 10x10x10 cm
- ~100,000 meshes, S12P1, 2G
  - 3x3x3 Coarse Meshes,
    - pbshield.pen
    - Pb
    - Water
    - 10 Ci CsCl
    - Stainless steel
    - Reflective



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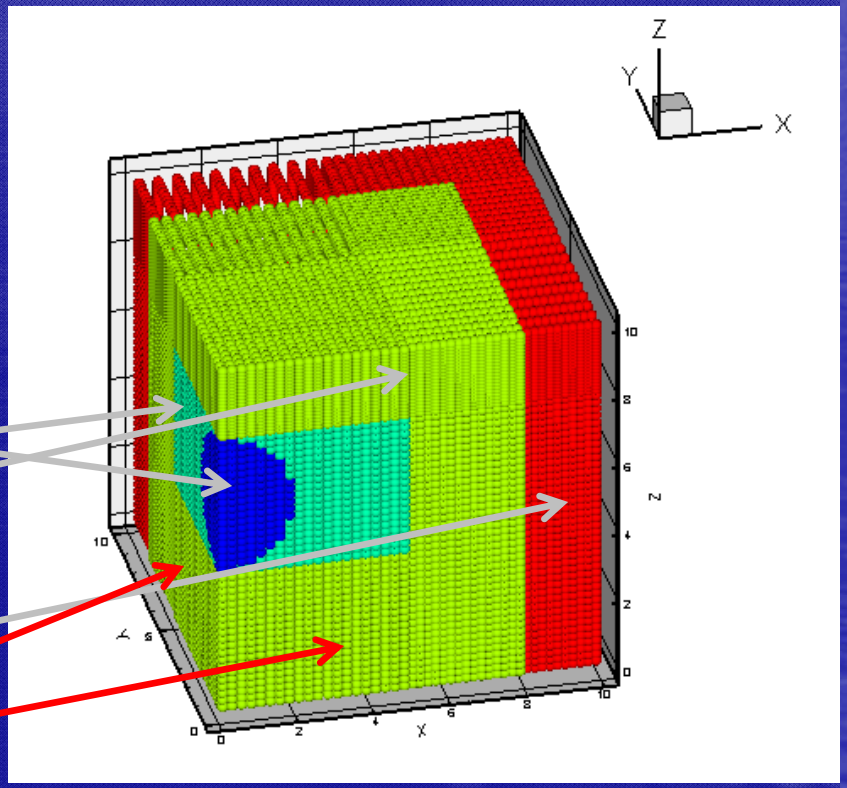
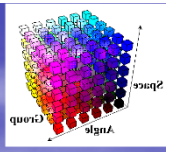
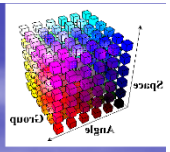




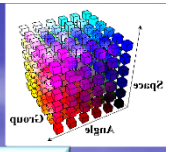
Run zippy.pen

- **Prepare a** 2 Parallel core **Script** for *zippy.pen*
  - Prefix: **zippy** Suffix: **pen** Nodes **1** Cores: **2**
  - **mpisub ppencrt** zippy pen 1 2
    - Copies zippy.pen to prb.pen
    - **Sets up** zippy.scr **script**
  - **Submit** to queue: **sbatch** zippy_2_pbs.scr
    - Note the **job number** reported back
    - Check queue status: **squeue <enter>**
      - When in workdir, type **"peek"** to see parallel feedback of last submitted job
- Post process output: **ppen-post** zippy pen 1 2



PENDATA Procedure

- **PENDATA**
  - **Data** (to the highest degree possible) is stored in PENTRAN as PARALLEL memory—each processor contains data only LOCALLY
  - ***If requested*, outputs** will be in a number of files
    - zippy.1, zippy.2 … run output from proc. 1, 2, etc
      - Contains important run data and metrics
    - zipply.L1, zippy.L2 … logfile outputs, etc
    - zippy.f1, zippy.f2 … binary flux data, etc
    - zippy.j1, zippy.j2 … flux and net current, etc



Run PENDATA, PENMSH-XP Plot

- **To run PENDATA**
  - In the local problem directory,
    type **PENDATA** <enter>
    - Enter the options as desired
    - PENDATA will gather all files from the parallel run in a transparent manner
- To use PENMSH to plot:
  - Go to **crit** directory
  - Type **penmsh –i moddir –f flxdir -msf 4**
    - **Will reference model and run to plot fluxes**