

Computational Plasma Physics Group (CPPG)

Presentation to PPPL Theory Review Committee

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by

S. C. Jardin and D. McCune, co-heads

The CPPG: Staff and Funding

Funding is about 35% from experimental projects, and 65% from NTCC and advanced computing initiatives

X. Tang	}	Background in modern computational physics
A. Pletzer		
R. Andre		
S. Ethier	}	Background in scientific visualization
S. Klasky		
T. Ludescher	}	Background in computer systems
L. Randerson		
S. Jardin*		PPPL Theory, MHD code developer, PU Faculty
D. McCune†		TFTR Data Analysis, primary TRANSP developer

* co-head, also member of NERSC EXERSUG, PAC, and ESSC

† co-head, also member of NTCC Steering Committee

The CPPG: Activities

- **Parallel programming and algorithm development**
- **Code dissemination, modernization, integration**
- **Tool development for experimental data analysis**
- **Tool development for predictive transport modeling**
- **Scientific visualization**
- **Cluster and visualization hardware projects**
- **Education, training, documentation**

Major CPPG Code Parallelization Projects

- parM3D** – MPI, domain decomposition, uses PETsc
- ORBIT**- OpenMP and MPI version
- GTC** – mixed MPI / OpenMP for IBM-SP2 at NERSC
- DEGAS2** - MPI
- VMEC optimization code** – “fork” parallelization on PU and LANL SGI Origin2000

Also help with several smaller projects & student thesis

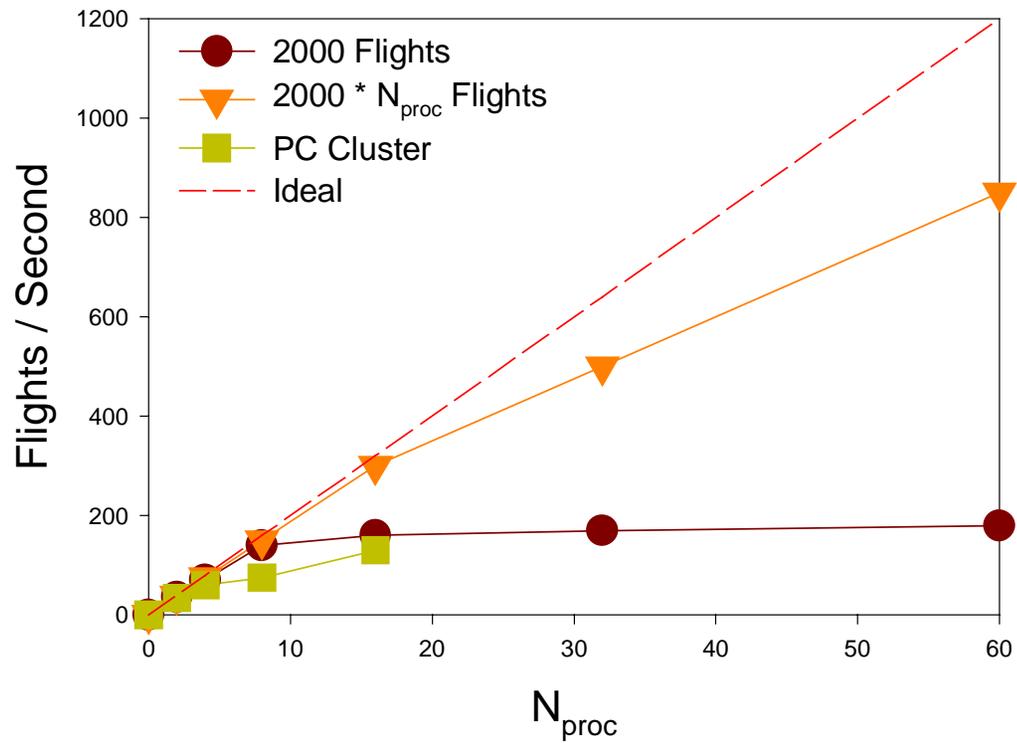
Parallel platforms available to us:

ORIGIN 2000 PU(64) LANL(256)- OpenMP, MPI, fork

LINUX cluster (16)- MPI

NERSC T3E (512), SP2(4000) - MPI (& mixed)

Parallel Scaling for DEGAS2



Typical scaling results as obtained with DEGAS2

TOPDAC Web Site

- TOPDAC: Tokamak Physics Design and Analysis Codes
- A collection of over 40 plasma physics and fusion physics codes that are available to the community.
- <http://w3.pppl.gov/topdac> is common site for disseminating information on these codes, their status, use, limitations, availability
- goal is for these codes to access data and work together seamlessly