High Speed with High-level Languages

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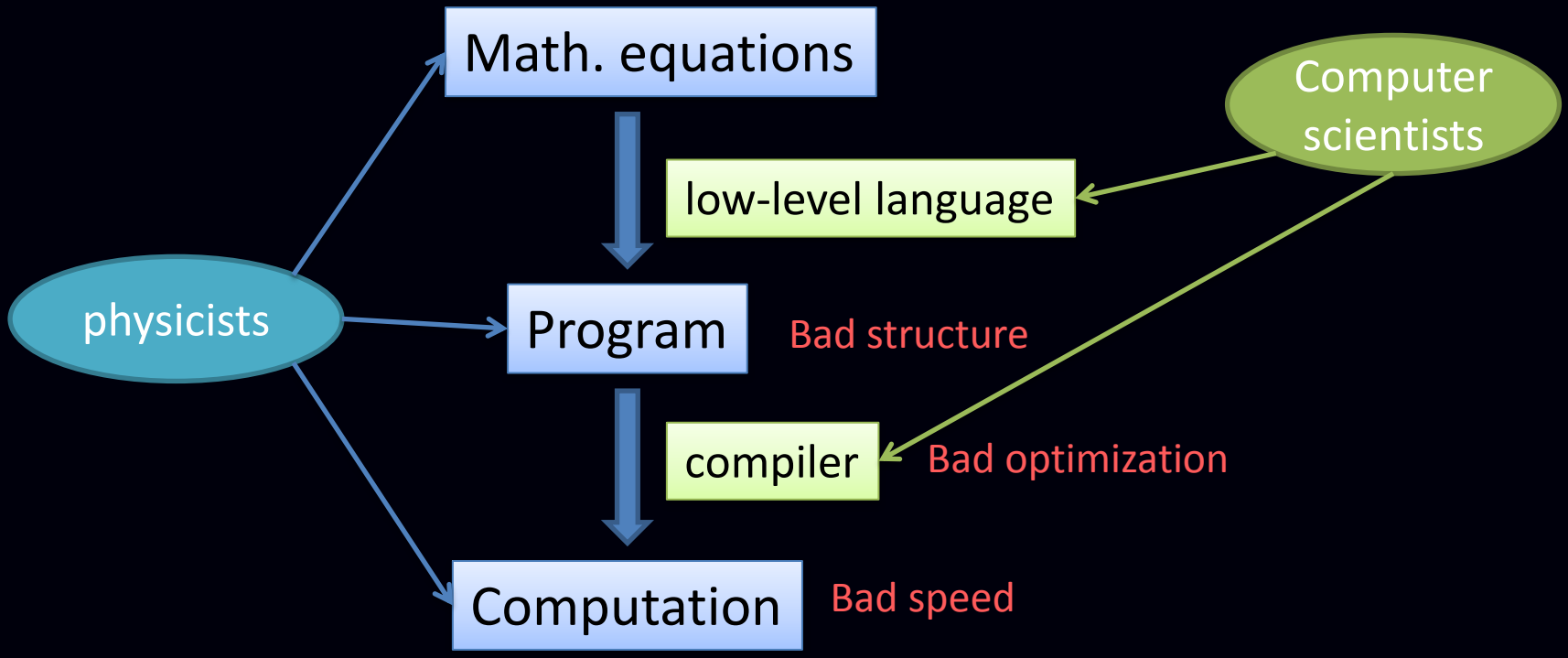
Current Problems



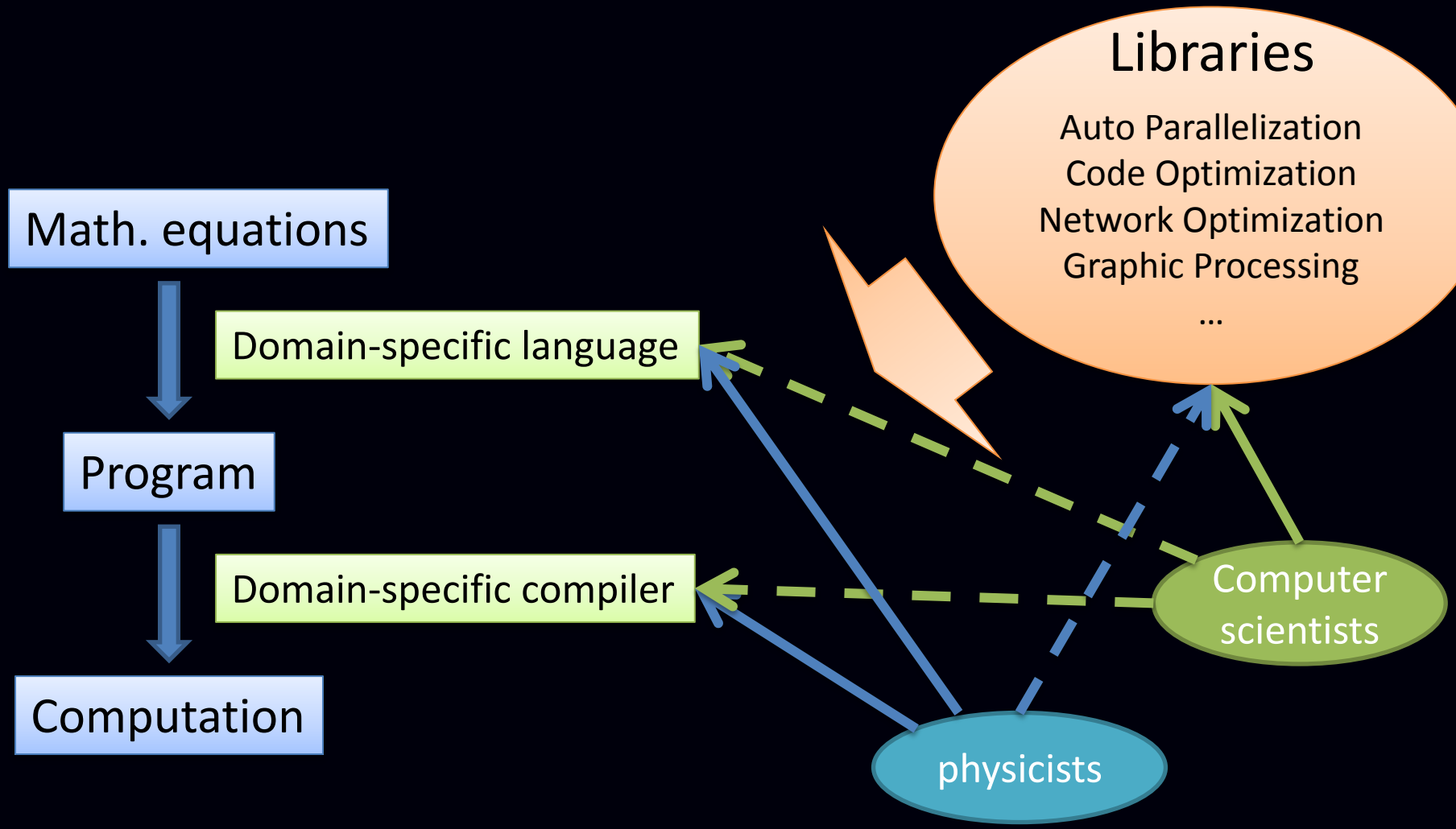
Misunderstandings

1. Very high-level languages are slooowww
2. Meta programming is slooowww
3. Dynamic programming languages are slooowww

Corrections

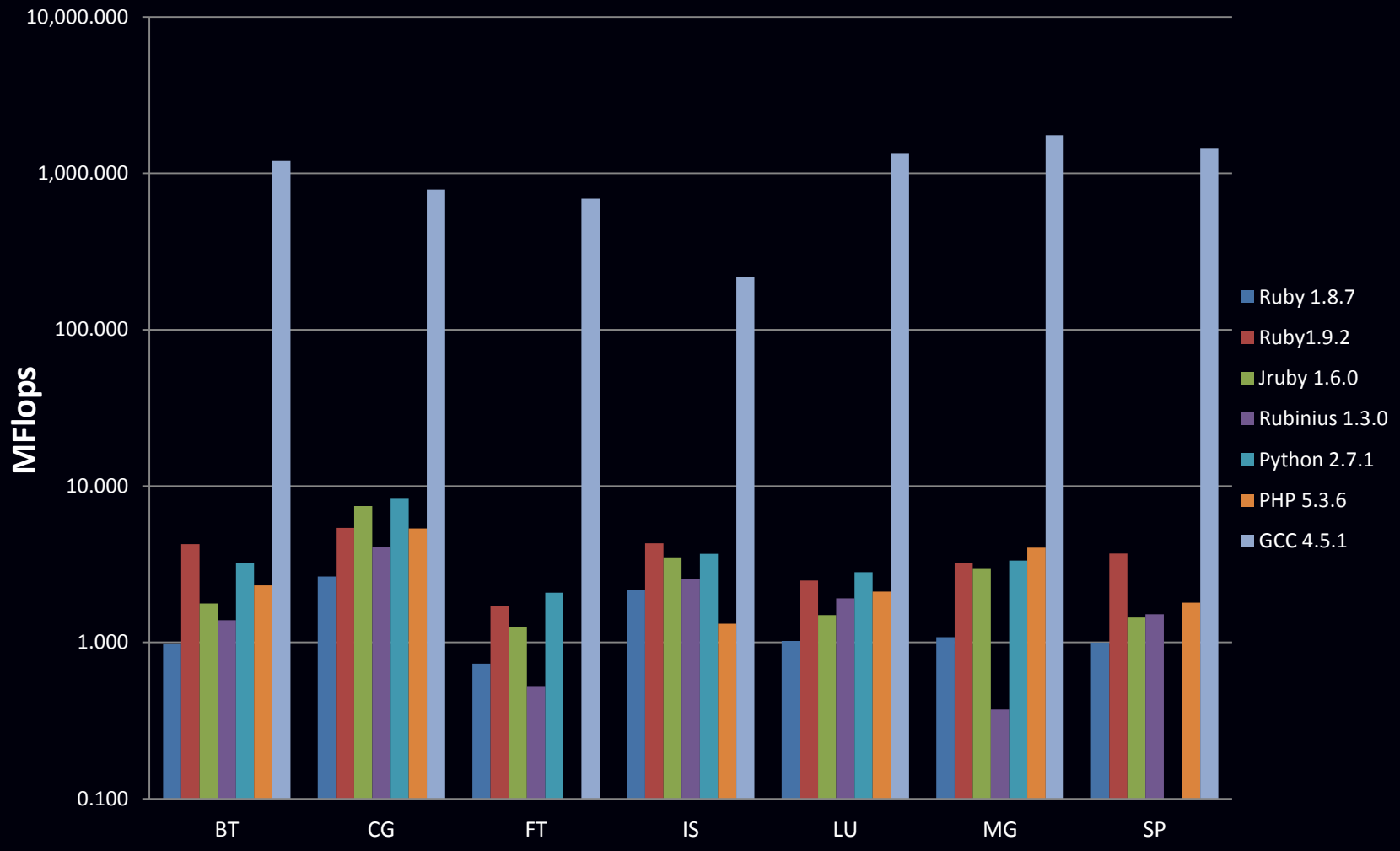
1. Very high-level languages can be fast
2. Meta programming can be fast
3. Dynamic programming languages can be fast

New Proposal



HPC Ruby compiler

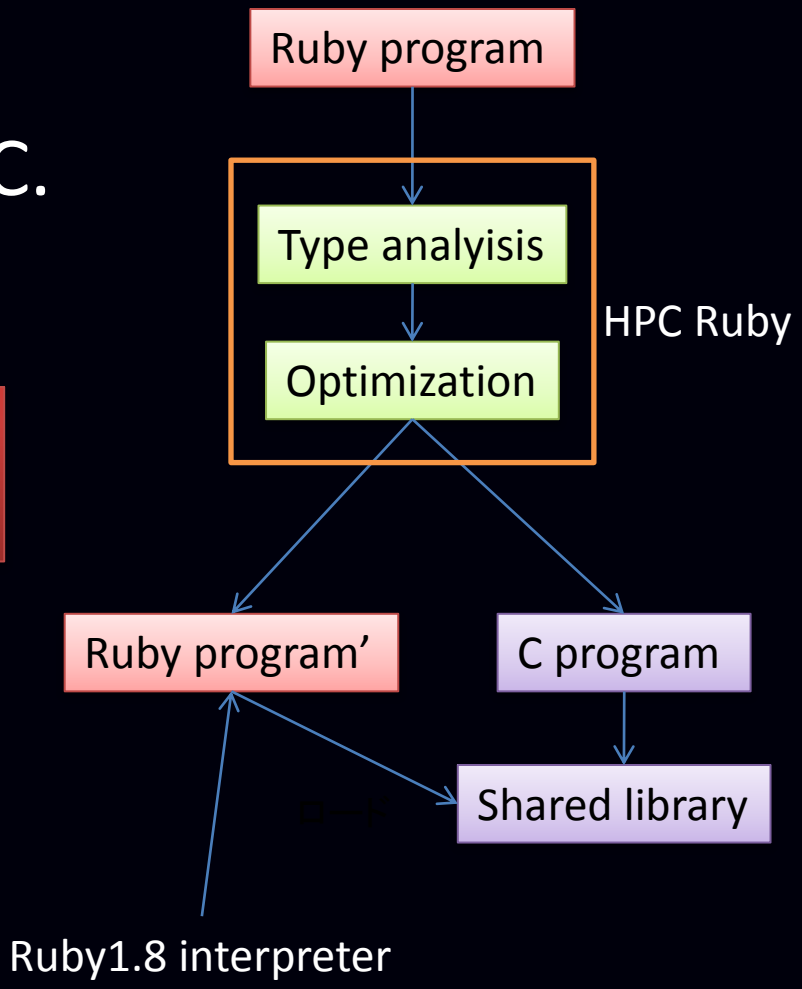
Nas Parallel Benchmarks [Nose2011]



HPC Ruby compiler

- Ahead Of Time (AOT) compilation from Ruby to C.
- Usage

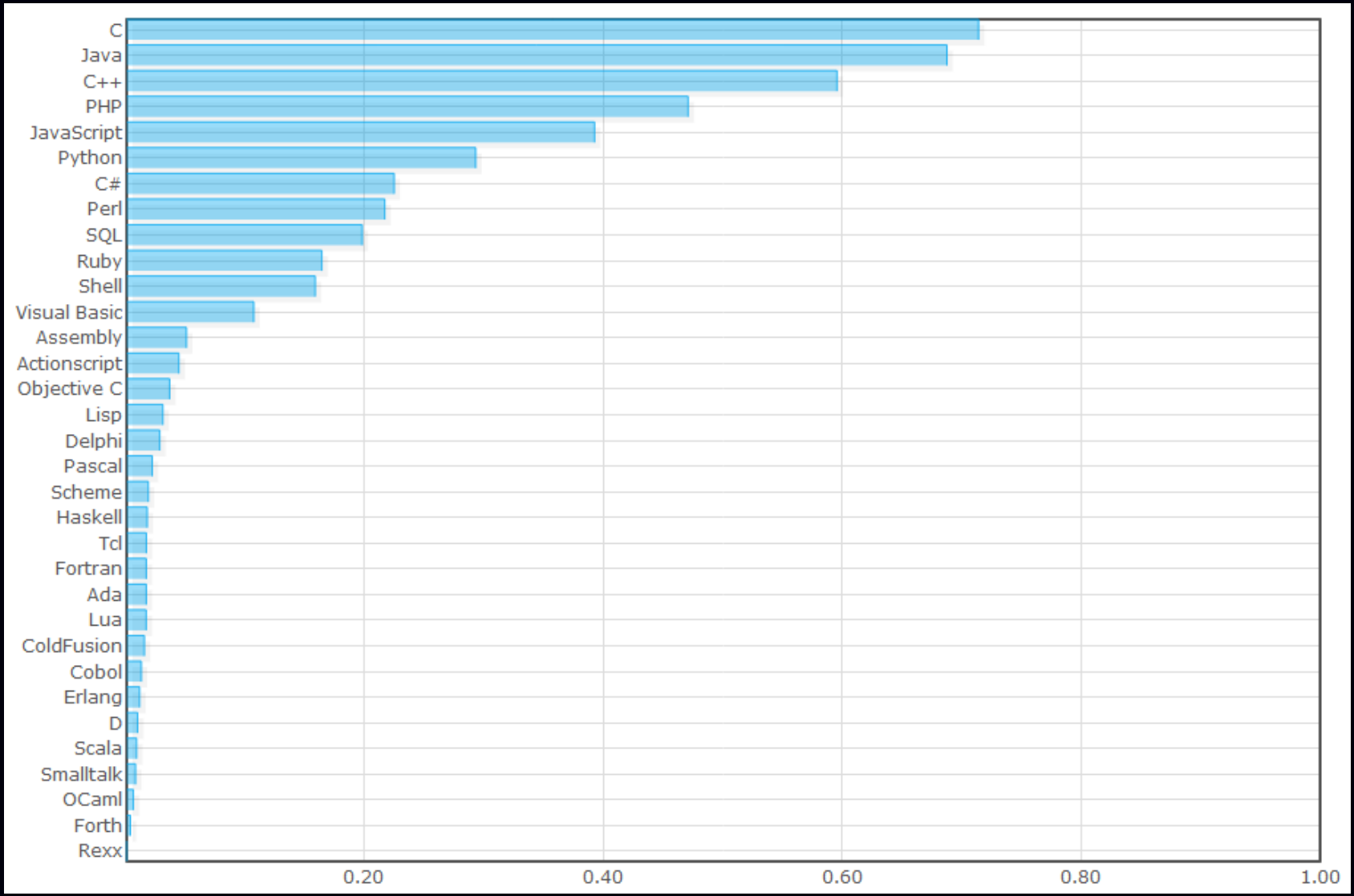
```
% rubyc foo.rb -o foo_opt.rb
% ruby foo_opt.rb
```



Why Ruby?

- High popularity
- Very high productivity
- Easy to use
- Dynamic code generation mechanism

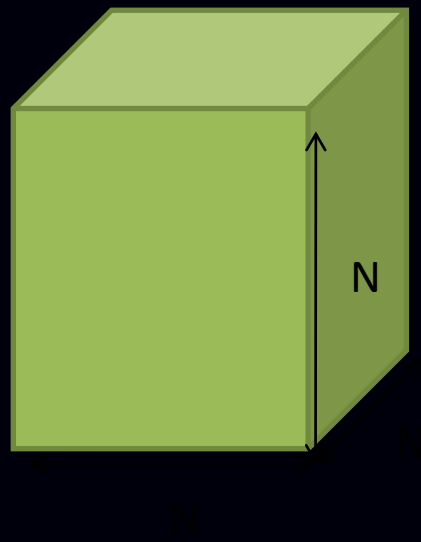
Why Ruby?


C
Java
C++
PHP
JavaScript
Python
C#
Perl
SQL
Ruby
Shell
Visual Basic
Assembly
Actionscript
Objective C
Lisp
Delphi
Pascal
Scheme
Haskell
Tcl
Fortran
Ada
Lua
ColdFusion
Cobol
Erlang
D
Scala
Smalltalk
OCaml
Forth
Rexx
0.20
0.40
0.60
0.80
1.00

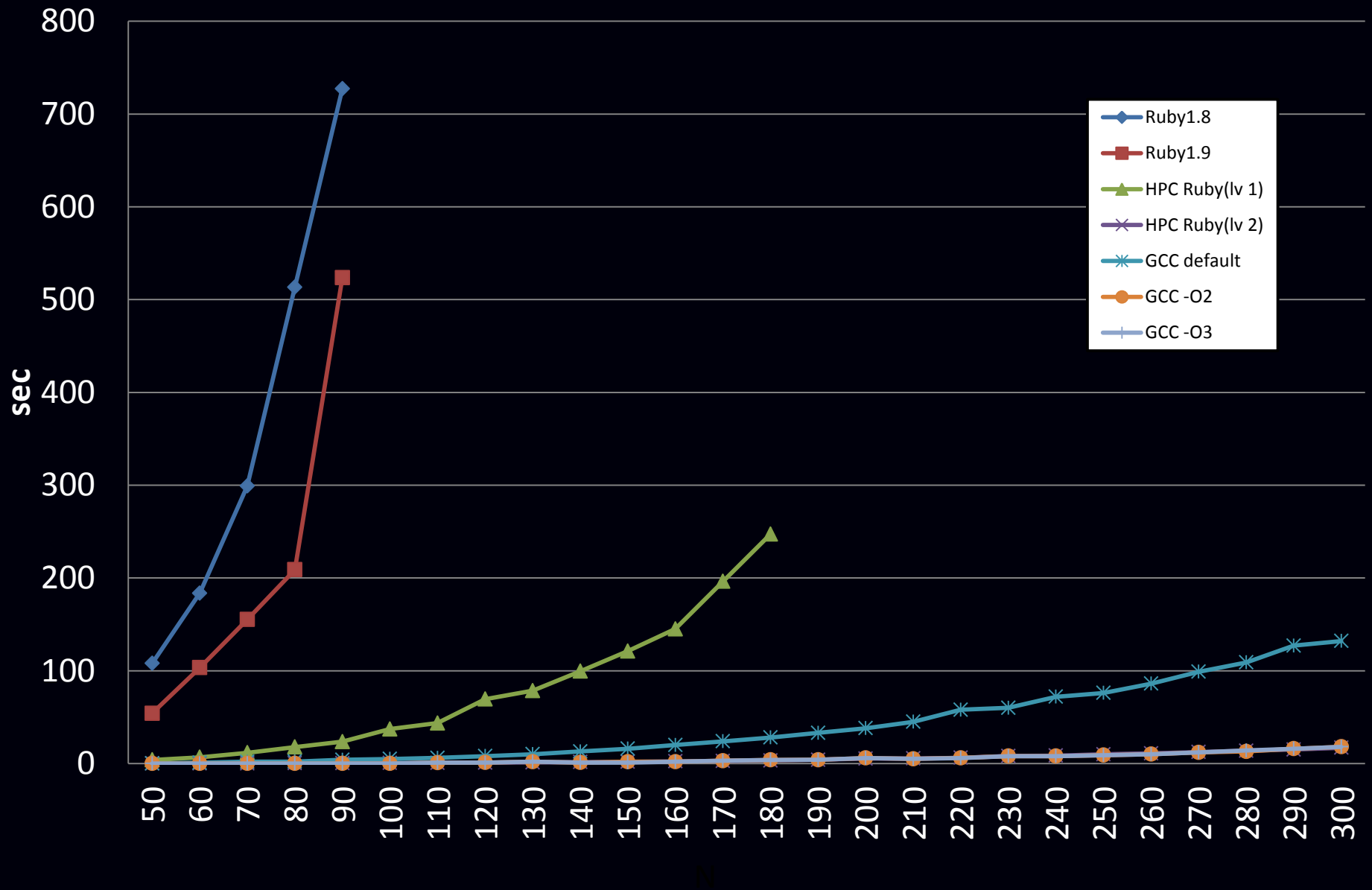
Nas Parallel Benchmarks [Nakamura 2011]

Benchmark 2

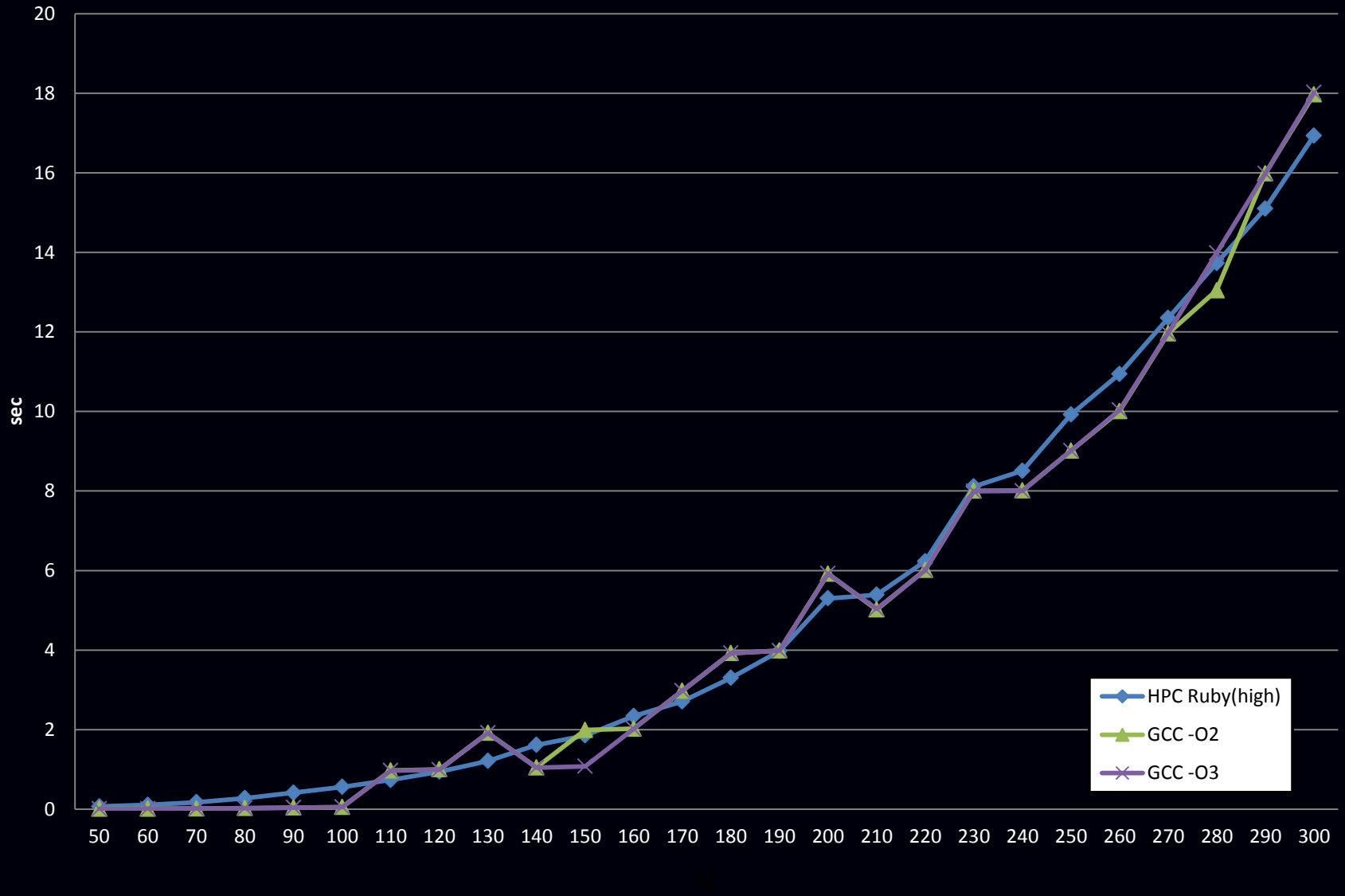
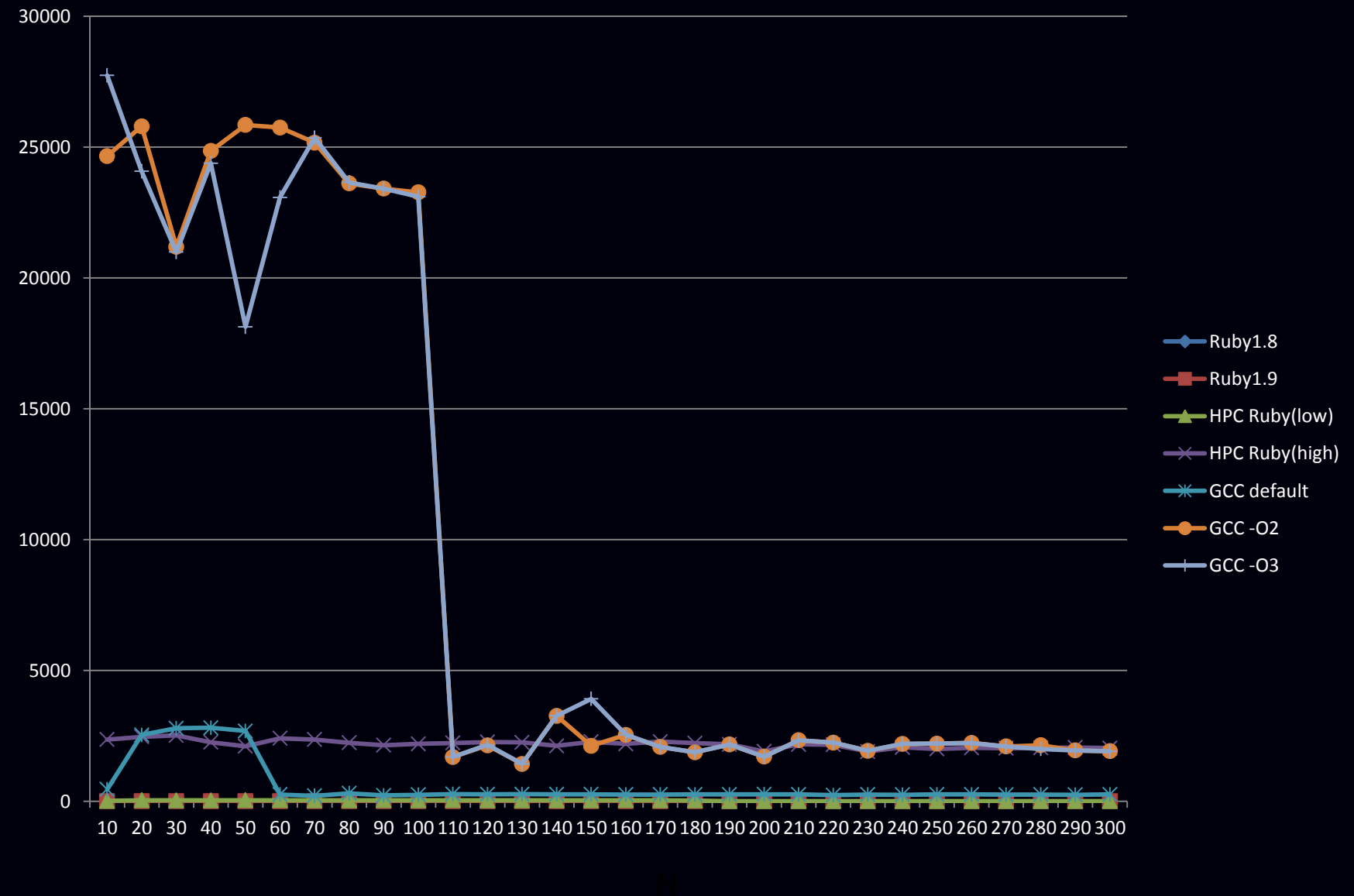
- Calculation of Thermal Diffusion Equation
  - 3D cubic space
  - 100 steps
  - complexity: O(N^3)



Execution Time



Execution Time



Million FLOPS