Research Group for Domestic P/E-Scale High-Performance Software and Algorithm Library
Institute of Software, Chinese Academy of Sciences

With high influence in China's high-performance computing (HPC), this research group has been devoting to the R&D of software for domestic supercomputers such as Sugon, Lenovo, Sunway and Tianhe during the past two decades. To tackle with the major challenges of HPC, they developed a new generation of high-performance algorithm library on Sunway TaihuLight, and successfully promoted a number of important applications in China. The group also designed a series of novel domain-decomposition algorithms for large-scale heterogeneous environments, and managed to make Tianhe-2 the world's No. 1 place in the HPCG List. Particularly in 2016, because of the major breakthroughs they made in the design of 10-millon-core scalable fully implicit solvers, the group won the ACM Gordon Bell Prize, which is the first time that China has won this high honor in its 29-year history. This achievement is seen as not only a landmark breakthrough in China's HPC development but also an irreplaceable contribution to world's recognition of China's global leadership in HPC.

Outstanding contributors of this research group

Yang Chao

He is the leading recipient of the 2016 ACM Gordon Bell Prize. He proposed the 10-million-core scalable fully implicit algorithm and led the R&D of the new generation of domestic high-performance software and algorithm library.

Sun Jiachang

As a founder and pioneer of parallel computing in China, he has made great contributions to the development of high-performance software, the cultivation of students and talents, and the combination of mathematics, computers and applications.

xMath算法库推动了"神威•太湖之光"上的多项重大应用.
The xMath library has promoted various important applications on Sunway TaihuLight.

2016年度"戈登·贝尔"奖获奖证书
The certificate for the 2016 ACM Gordon Bell Prize

Major contributors

Li Yucheng
Liu Fangfang
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Wei Ying
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Ma Wenjing
Zhang Jiajia
Zhang Ya
Zhao Hui

新一代高性能共性基础算法库软件xMath用户手册.
User's manual for the new generation high-performance algorithm library xMath.

2014年11月"天河2号"取得HPCG世界排名第一的证书
The certificate for the first place on the HPCG List of November, 2014.

268 272 276 280 284 288 292 296 300 304
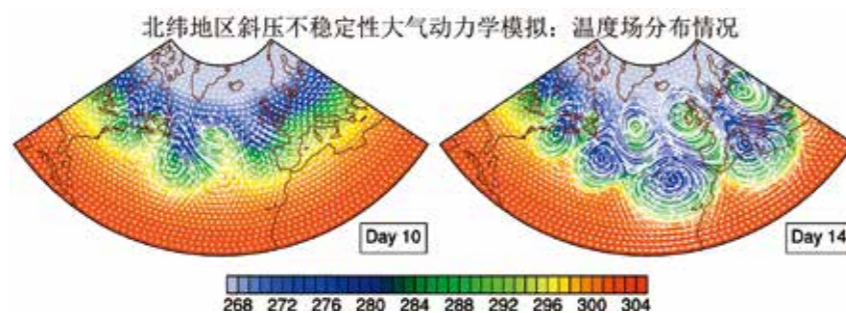
千万核可扩展全隐式求解器有助于大幅提高大气动力学模拟能力.
The 10m-core scalable fully implicit solver can substantially improve the simulation capability of atmospheric dynamics at the extreme-scale.

2016年11月17日，研究集体在美国盐湖城举办的SC大会上获颁2016年度"戈登·贝尔"奖
The research group received the 2016 ACM Gordon Bell Prize on November 17, 2016, during the SC'16 Conference at the Salt Lake City, USA.

国产P/E级高性能软件与算法库研究集体

推荐单位：中国科学院软件研究所

研究集体主要科技贡献：

该研究集体是我国高性能计算领域有重要影响的团队，二十年来始终致力于曙光、联想、神威、天河等系列国产高性能计算机的软件研发。该集体面向高性能计算的重大挑战，在世界最高性能的国产超级计算机上，研制了新一代高性能共性基础算法库，推动了"神威　太湖之光"的多项重大应用；发展了适应于大型异构环境的区域分解算法，实现了"天河2号"HPCG世界排名第一；突破了千万核规模下全隐式求解器设计关键技术，获得了国际高性能计算应用最高奖——美国计算机学会"戈登　贝尔"奖，是我国高性能计算领域里程碑式的突破，为我国进入全球超算领跑行列做出了不可替代的贡献。
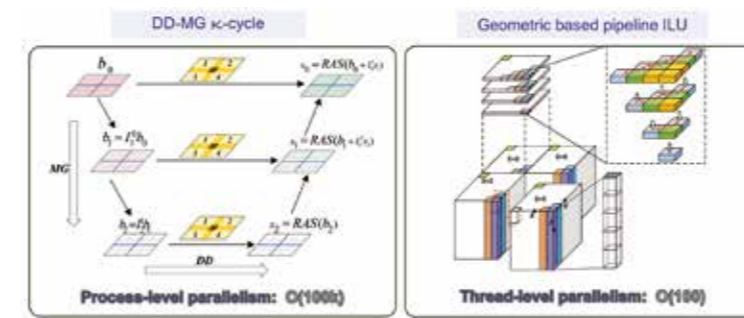
世界首个千万核可扩展全隐式求解器的主要设计思想.
The major design philosophy of the world's first 10m-core scalable fully implicit solver.

xMath算法库全面支持"神威•太湖之光"所配备的国产SW26010众核处理器.
The xMath library fully supports the domestic SW26010 many-core processor, which is the major horsepower of the Sunway TaihuLight supercomputer.

研究集体突出贡献者

杨超　中国科学院软件研究所
主要科技贡献：提出千万核可扩展全隐式求解器算法并领衔获"戈登•贝尔"奖，主持完成新一代国产高性能软件与算法库研发。

杨超　Yang Chao

孙家昶　中国科学院软件研究所
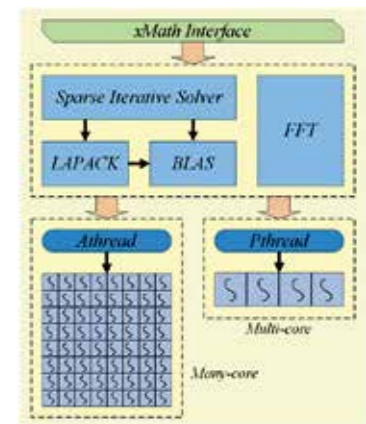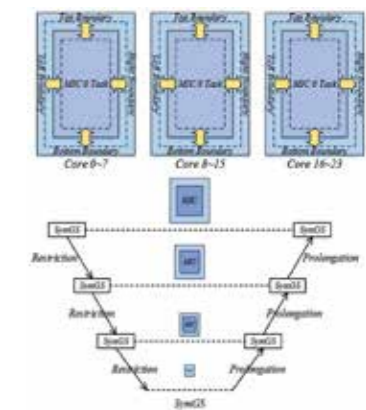主要科技贡献：我国并行计算学科创始人之一，为高性能软件研制、人才培养及数学、计算机与应用结合做出了重要贡献。

孙家昶　Sun Jiachang

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魏　颖　赵海涛　马文静　张佳佳　张　娅　赵　慧

异构区域分解算法的设计示意图.
Schematic of the heterogeneous domain decomposition method.