Project No.： 19003
Core Institution in Japan:Osaka University

JSPS Core-to-Core Program
Strategic Research Networks-
F Y 2011 Research Report

Project No.	19003
Research Theme	High Energy Density Science
Duration of Project	April 1st, 2009 – March 31, 2012 (36 months)
Core Institution in Japan	Osaka University

Implementing Organizations

Country	Japan
Core Institution	Osaka University
Co-Chair (name and title)	Graduate School of Engineering, Osaka University・Professor・Ryosuke Kodama
Number of Cooperating Institutions	22
Cooperating Institutions	Tohoku University Utsunomiya University, Univ. of Electro- Communications Tokyo University Tokyo Institute of Technology Yokohama National University Nagoya University Kyoto University Hiroshima University Setsunan University The Graduate School for the Creation of New Photonics Industries National Institutes of Natural Sciences (NINS) National Institute of Advanced Industrial Science and Technology Japan Atomic Energy Agency Japan Aerospace Exploration Agency Kumamoto University Ehime University Aoyama Gakuin University RIKEN Institute for Laser Technology Okayama University Kyushu University

Country	U.K.
Core Institution	Rutherford Appleton Laboratory
Co-Chair (name and title)	Central Laser Facility・Professor・Peter Norreys
Number of Cooperating Institutions	6
Cooperating Institutions	Imperial College London University of Oxford University of York Queen's University Belfast University of Strathclyde University of Essex
Matching Fund	Science and Technology Facilities Council (STFC) ・Photon Science Department Program

Country	France
Core Institution	Ecole Polytechnique (CNRS)
Co-Chair (name and title)	Laboratoire pour l'Utilisation des Lasers Intenses (LULI)・ Senior Scientist・Michel Koening
Number of Cooperating Institutions	7
Cooperating Institutions	Universite Pierre et Marie Curie Commissariat Energie Atomique CEA/DAM Ile-De-France, Bru'eres-le-Chatel Observatoire de Paris-Meudon Laboratoire pour l'Application des Lasers de Puissance (CNRS) ENSMA University of Bordeaux I
Matching Fund	①CNRS・LULI ②CNRS・PICS

Country	U.S.
Core Institution	University of California San Diego
Co-Chair (name and title)	Engineering science・Associate Professor・Farhat Beg
Number of Cooperating Institutions	16
Cooperating Institutions	University of California, Berkeley Ohio State University Princeton University University of Texas, Austin Lawrence Berkeley National Laboratory Lawrence Livermore National Laboratory Sandia National Laboratory University of Michigan Rice University University of Rochester University of Nevada, Reno General Atomics Purdue University University of Maryland Los Alamos National Laboratory NASA
Matching Fund	①DOE OFES・Fast Ignition ②National Science Foundation・US-Japan Collaboration

Result of Program Implementation

Under the project "International Collaboration for High Energy Density Science (ICHEDS)" supported by JSPS Core-to-Core Program, we have strategically explored the high energy density sciences. The expeditions were made by applying focused and cross-sectional approaches to the following five categories: a) Relativistic Plasma Physics, b) High Pressure Condensed Matter, c) Warm Dense Matter, d) Laboratory Astro Physics, e) Plasma Photonics. Joint researches have been made by using high-power laser facilities all over the world under this program. The ICHEDS has played a role of one of "the global core centers" in the area of high energy density science, powered by virtual center capabilities to exchange related information and form a network of the next-generation researchers.

Achievements in FY2011 (Self Review)

In 2011 FY, we have sent a total of 55 scientists and students abroad in the Strategic Research Network Project.

Joint experiments on 1)relativistic plasma, 2)high pressure condensed matter, 3)warm dense matter, 4) laboratory astrophysics and 5) plasma photonics have been carried out by using high-power laser facilities at Osaka University in Japan, Rutherford Appleton Laboratory in UK, Ecole Polytechnique LULI in France, University of Rochester, and University of Michigan in US. About 10 journal papers such as Nature, High Energy Density Physics, and Physics of Plasmas have been published as its result.

As for Seminar, two joint workshops wre held in Japan. One in Osaka and one in Kanazawa.
By using support for young scientists, Japan-UK-US-France School on high energy density sciences was held in Kanazawa. The Kanazawa workshop and Kanazawa school are held continuously, resulting in the efficient and economical advantages on the arrangement.
Consequently, a larger number of young scientists and graduate students could join to the workshops and winterschools. These events must have been effective for graduate students to be young scientists having an international leadership.

Future Plan (Measures toward Achieving Research Objectives)

In this project on high energy density sciences under the core to core program, we have successfully achieved joint researches and seminars with UK, France and US as a bilateral corporation and concluded bilateral agreements between Ecole Polytechnique LULI and Department of Engineering, Osaka University in 2009 and renew the agreement with the Science and Technology Facilities Council (STFC) in 2011.
we are continuing this high level of activities with UK, France and US as a multilateral cooperation in the framework of the Strategic Research Network Project.
Joint workshops are now established as regular meetings with UK, France and US and in 2011 we could get support from UK and US embassy, so we hope continuing workshops and shchools will be held.