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| **Principal Researcher** | Keizo Ishii | **Number of Researchers** | 3 |
| **Research Institution・Department・Title** | Professor, Department of Quantum Science and Energy Engineering, Tohoku University | **Location of Institution** | Sendai |

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| **Title of Project** | Development of 3 D micron-CT to observe the interior of cells with high space resolving power and high-speed photograph |
| **Abstract of Research Project** | At present, the technology of in site cell treatment and the therapy based on this technology(e.g. the gene therapy)progress rapidly. This technology will be developed further by a technique to observe, three-dimensionally and in real-time, the interior of living cells. We propose the development of a novel three-dimensional computed tomography with micro-meter resolution using a point source of X-rays produced by proton micro-beams. The proton micro-beams are irradiating a metallic target which emits characteristic X-rays. Since the contribution of the continuous X-rays produced by proton beams is very small, the X-ray spectrum is almost monochromatic, and therefore, is well suited to high-quality X-ray imaging. Three-dimensional X-ray images with 1μm space resolving power can be obtained by the use of the X-ray CCD camera. High-speed photograph is realized by scanning the particle beam, thereby moving the point source. In addition, by using the K-absorption edge of elements, an image of elemental distribution in the cell obtained. |
| **References** | 1）S. Matsuyama, K. Ishii, et al.," Development of a Micro-PIXE Camera", International Journal of PIXE,8(1998)203-208.<br>2）A. Sugimoto, K. Ishii, et al.," Application of Micro-PIXE Camera to Elemental Analysis of a Single Cell", International Journal of PIXE,9(1999)151-160.<br>3）K. Ishii, A. Sugimoto, et al., , "Elemental analysis of cellular samples by in-air micro-PIXE", Nuclear Instrument and Methods in Physics Research B 181(2001)448-453. |
| **Term of Project** | Fiscal years 2001-2005. (5 years) |

| **Budget Allocation** (in thousand of yen) | FY2001 | FY2002 | FY2003 | FY2004 | FY2005 | Total |
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| | 43,200 | 19,100 | 7,200 | 14,500 | 2,300 | 86,300 |

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| Homepage Address | http://www.qse.tohoku.ac.jp/lab/ishii/index-e.html |