RECENT PROGRESS IN MUON RADIOGRAPHY
- Life Science, Cargo Surveillance, etc. –

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After a review of Muon Science [1], more than 50% of which is complementary to Positron Science, a rapid development was marked in the exclusive application of muons to various types of radiography to explore inner-properties of relatively thick materials by using a unique nature of a heavy-electromagnetic-interacting particle. Distinguished examples can be summarized as follows. 1) *MeV Accelerator Muons for Medical Use*, based upon recent success on the detection of the blood magnetism [2] as well as the measurement of the protein-electron-transfer [3], a new brain function study will be opened; 2) *100 MeV Compact Mobile Accelerator Muons for Cargo Surveillance*, element-selective radiography realized by employing muon-producing compact accelerator and muon re-acceleration will be an only method to detect a hidden special nuclear material in a cargo like oil filled trolley [4]; 3) *GeV~TeV Horizontal Cosmic-ray Muons for Geo-science and Industrial Applications*, inner-structure as well as time-dependent change of representative volcanic mountains were successfully probed [5,6] and a detection of the inner-behavior of the blast furnace for iron-making was recently achieved [7].

All of these works will be systematically reviewed, which may stimulate a new application field of Positrons.

[1] K. Nagamine "*Introductory Muon Science*", Cambridge University Press, Cambridge (2003) 1-208. [2] K. Nagamine, K. Shimomura et al., Preprint (2005). [3] K. Nagamine and E. Torikai, J. Phys. Condensed Matter, 16 (2004) S4797. [4] K. Nagamine, Proc. Jpn. Acad. Sci., B 80 (2004) 179. [5] K. Nagamine et al., Nuclear Instruments A356 (1995) 585. [6] H. Tanaka, K. Nagamine, et al., Nuclear Instruments A507 (2003) 657 and in press (2005). [7] K. Nagamine, H. Tanaka et al., Proc. Jpn. Acad. Sci., in press (2005).