Advanced Laser and Photon Science
レーザー・光量子科学特論

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（Tuesday. 16:50-18:35）

http://ishiken.free.fr/english/lecture.html
(for course materials by Ishikawa)

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With recent progress in laser technology, it is increasingly important to understand laser-matter interaction for atomic and molecular physics research as well as for materials processing and medical applications.

Kenichi Ishikawa & Takeshi Sato

- Interaction between intense femtosecond laser pulse with atoms
- Attosecond science, one of the hottest field in laser science
- First-principles simulation

Shuichi Hasegawa

- Spectroscopy and laser manipulation of atoms and ions

Schedule

4/10	Ishikawa
4/17	Sato
4/24	Ishikawa
5/1	Ishikawa
5/8	Hasegawa
5/15	Hasegawa
5/22	no lecture
6/5	Hasegawa
6/12	Hasegawa
6/19	Sato
6/26	Ishikawa
7/3	Sato
7/10	Sato

Schedule

Kenichi Ishikawa & Takeshi Sato

4/10	Laser fundamentals
4/17	Brief review of quantum mechanics
4/24	High-field phenomena (atom in an intense laser field)
5/1	High-field phenomena (high-harmonic generation, attosecond pulse)
6/19	Attosecond science
6/26	Attosecond science
7/3	First-principles simulations
7/10	First-principles simulations

Evaluation/grading

Based on ...

- Attendance
- Reports

Course materials will be uploaded at
http://ishiken.free.fr/english/lecture.html

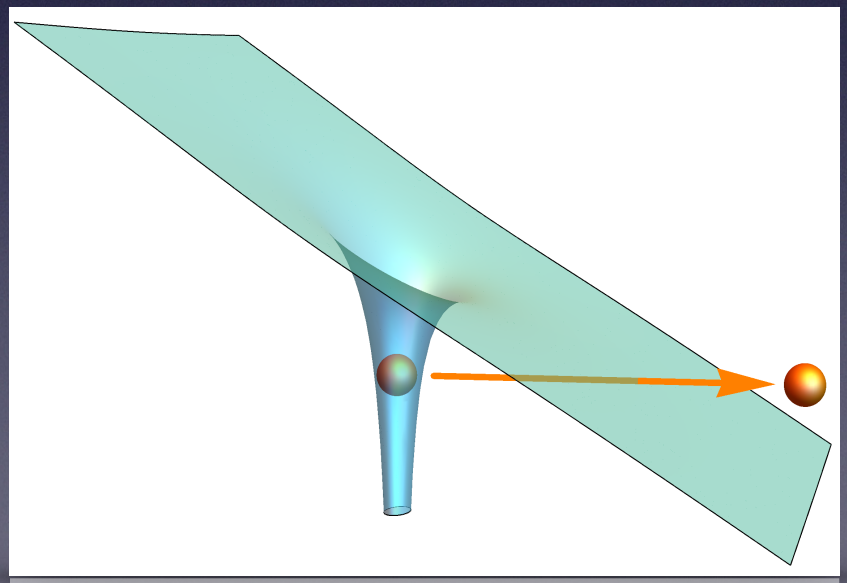
Why intense laser in nuclear engineering

Nuclear research institutes have always been main driving force of intense laser technology. For example ...

- Laurence Livermore National Laboratory (USA)
- Atomic Energy Commission (France)
- Japan Atomic Energy Agency (Japan)

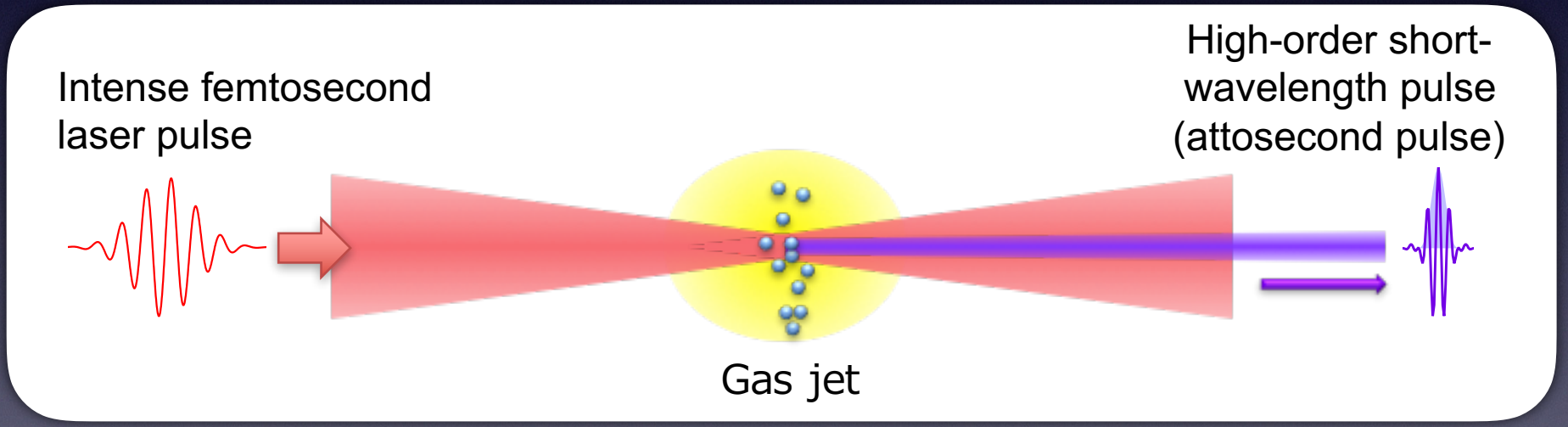
Intense laser is an ionizing radiation!

- Above-threshold ionization (ATI, 超閾イオン化)
- Tunneling ionization (トンネル電離)



Intense laser produces high-quality ionizing radiation!

- High-harmonic generation (HHG, 高次高調波発生)



- Proton & electron acceleration (レーザー加速)