Intermolecular Coulombic decay and control of photoinduced processes in physics, chemistry, and biology

Fact Sheet

Project Information

ICD

Grant agreement ID: 227597

Project closed

Start date
1 February 2009

End date
31 January 2015

Funded under
Specific programme: "Ideas" implementing the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007 to 2013)

Total cost
€ 1 950 000,00

EU contribution
€ 1 950 000,00

Coordinated by
RUPRECHT-KARLS-UNIVERSITAET HEIDELBERG
Germany

Objective

When embedded in a suitable environment, excited or ionized atoms and molecules can hand over their excess energy to their neighbors extremely efficiently via the interatomic (intermolecular) Coulombic decay (ICD) mechanisms. The ICD has been

predicted theoretically by the applicant and co-workers and has recently found full confirmation in a series of spectacular experiments. The theoretical and experimental work on ICD performed until now and the progress achieved established the generality of the phenomenon and open new horizons for the ICD research. There is an enormous potential inherent in the ICD and the present proposal is aimed at exploring and exploiting it in systems of physical, chemical, and biological interest. In particular, the high efficiency of the ICD compared to various photoinduced processes like photon emission, isomerization, and charge transfer, makes the ICD extremely attractive for quenching in a controllable fashion such fundamental processes in biophysically relevant systems. Furthermore, the ICD phenomenon produces low-energy electrons and can be expected to be a relevant source of such electrons in nature. It has been proven that low-energy electrons induce serious damages in DNA and it is natural to investigate the importance of the ICD in the production of such electrons after irradiation. We are convinced of the fundamental and practical relevance of ICD and our vision is to be able to exploit this basic process in systems of interest. To achieve this breakthrough requires an enormous investment in advancing methodologies. This, in turn, can only be reached by a highly motivated strong team of scientists closely collaborating over a long period of time. The support by the ERC can substantially contribute to the realization of this vision.

Fields of science (EuroSciVoc)

natural sciences > biological sciences > genetics > **DNA**

natural sciences > physical sciences > theoretical physics > particle physics > **photons**

Keywords

controlled quenching of photoinduced processes

ultrafast environment-mediated processes

Programme(s)

FP7-IDEAS-ERC - Specific programme: "Ideas" implementing the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007 to 2013)

Topic(s)

ERC-AG-PE4 - ERC Advanced Grant - Physical and Analytical Chemical sciences

Call for proposal

ERC-2008-AdG
See other projects for this call

Funding Scheme

ERC-AG - ERC Advanced Grant

Host institution

RUPRECHT-KARLS-UNIVERSITAET HEIDELBERG

EU contribution

€ 1 950 000,00

Total cost

No data

Address

SEMINARSTRASSE 2
69117 Heidelberg
Germany

Region

Baden-Württemberg > Karlsruhe > Heidelberg, Stadtkreis

Activity type

Higher or Secondary Education Establishments

Links

Contact the organisation Website
Participation in EU R&I programmes
HORIZON collaboration network

Beneficiaries (1)

RUPRECHT-KARLS-UNIVERSITAET HEIDELBERG

Germany

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