

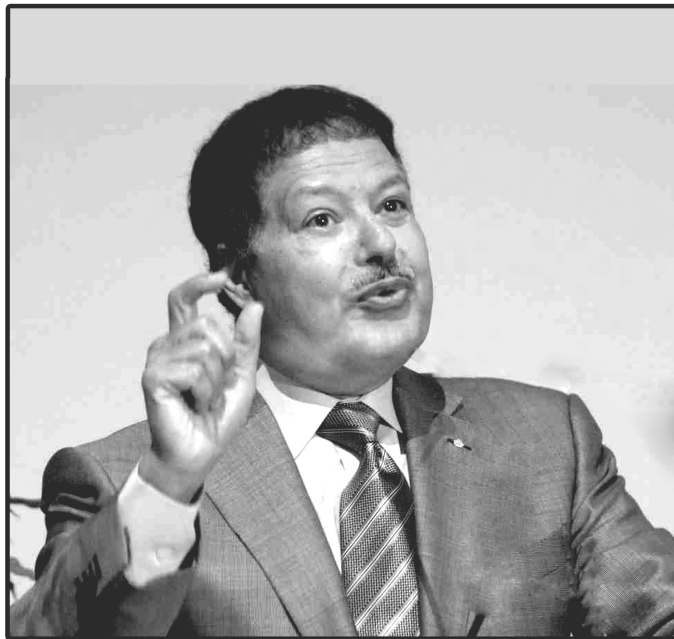
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THE BRILLIANT ZEWAIL





PREFACE

The eleven chapters in this book have each been divided into parts. The first chapter was written by Zewail's sister and is meant to enlighten a period of his life that few people may know. It describes the life of Ahmed Zewail; focusing on his childhood, early family life, glimpses of brilliance and eagerness to achieve scientific success.

The following chapters take a more objective view of his life after his breakthrough invention, in which Zewail became the first person in the world to capture, in a few femtoseconds, the exact moment when molecules divide or unite. That moment marked the dawn of a new era for chemistry. The chapters go on to focusing on the ramifications of his work and his persona on a global context and his efforts on strengthening the basics of science and technology in the land of his birth — Egypt. These chapters also express the ideas created by Zewail — together with his collaborators — to test and measure unprecedented thought experiments that follow the molecular behaviors in space and time, which were otherwise undetermined, inventing the four-dimensional electron microscope.

Femtochemistry and femtobiology provide not only the most detailed information about chemical reaction dynamics, but they hold the promise that, one day, researchers could create completely novel materials. For the past years, these significant fields had yielded

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thousands of published papers in physical chemistry that are highly cited.

Besides his scientific successes, the chapters also give a hint on Zewail's personal attitude and brilliance, describing him as glamorous and having a wonderful character. Readers are urged to go through Chapter 11 in order to see for themselves Zewail's long list of scientific publications and awards.

Zewail's brilliance did not end with his passing, but instead it laid down the prospects for the fine tuning of the motion and reactivity of molecules. Colleagues and students at Caltech are still publishing papers with Zewail's name as co-author in international journals up to 2018. If proved successful, laser-customised chemistry may be developed in the coming decades.

Lotfia El-Nadi
University of Cairo
20 March 2019

ABOUT THE EDITOR



Lotfia El-Nadi is the Vice Director of the International Committee of Scientific Research, National Institute of Laser Enhanced Sciences (NILES), Cairo University. She is also the Vice Director of the International Center of Scientific and Applied Studies for High Density Short Pulse Lasers, NILES, Cairo University since 2006.

El-Nadi obtained her B.Sc. in physics and chemistry from Cairo University; M.Sc. in radiation physics from Birmingham University, and Ph.D. in nuclear physics from Cairo University. Her expansive academic career includes posts at Cairo University, Qatar University, and King Abdul Aziz University in Saudi Arabia.

From 1990 to 1993, she was director of the National Center of Lasers and Applications at Cairo University. Between 1991 and 1994, she was Head of the Physics Department at Cairo University. She has also been a board member of the National Institute of Laser Enhanced Sciences at Cairo University 2005/2008 and 2016/2018.

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Summary of Lotfia El-Nadi's achievements

- Elected a member of the International Committee of Ultra Intense Lasers (ICUIL — www.ICUIL.org) at GSI meeting in Germany (2018).
- Awarded the Trophy of the Indian Government, March (2014).
- Awarded the Egyptian Government Medal Wissam of Science and Arts Grade 1 (2013).
- Appointed member of the Advisory Board of Zewail City of Science and Technology (2012).
- Awarded the Academy of Sciences Highest Credit Award of Advanced Sciences (2009).
- Awarded the Ordre des Palmes Académiques from the Prime Minister of France, October (2004).
- Awarded the Cairo University Shield (1994).
- Awarded the Darmstadt University Golden Medal (1994).
- Established the National Institute of Enhanced Laser Sciences at Cairo University (1994).
- Established the Topical Society of Laser Sciences (TSLs — www.tsls.org.eg) (1987).
- Published more than 125 Papers in international and national journals.
- Supervised 72 Phd and MSc theses, two are still in progress.
- Published two books on Lasers and Applications in Arabic (1990 and 1993).
- Edited 2 AIP International Conference Proceedings (2004 and 2006).
- Editor-in-chief of the MTPR conferences online journal www.mtpr.pub, Dec. 2018.
- Organized seven International Conferences on Modern Trends in Physics Research (MTPR) and four International Workshops on Ultrafast Laser Technology and Applications (UFLTA).

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