



# Charles Townes: Father of the Field of Photonics

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Presented at Frontiers in Optics, San Jose, October 18, 2015



# Charles Townes: Father of the Field of Photonics

Part of the Charles Townes Legacy

Inventor of the Laser

Discoverer of Fundamental Nonlinear Optical Processes

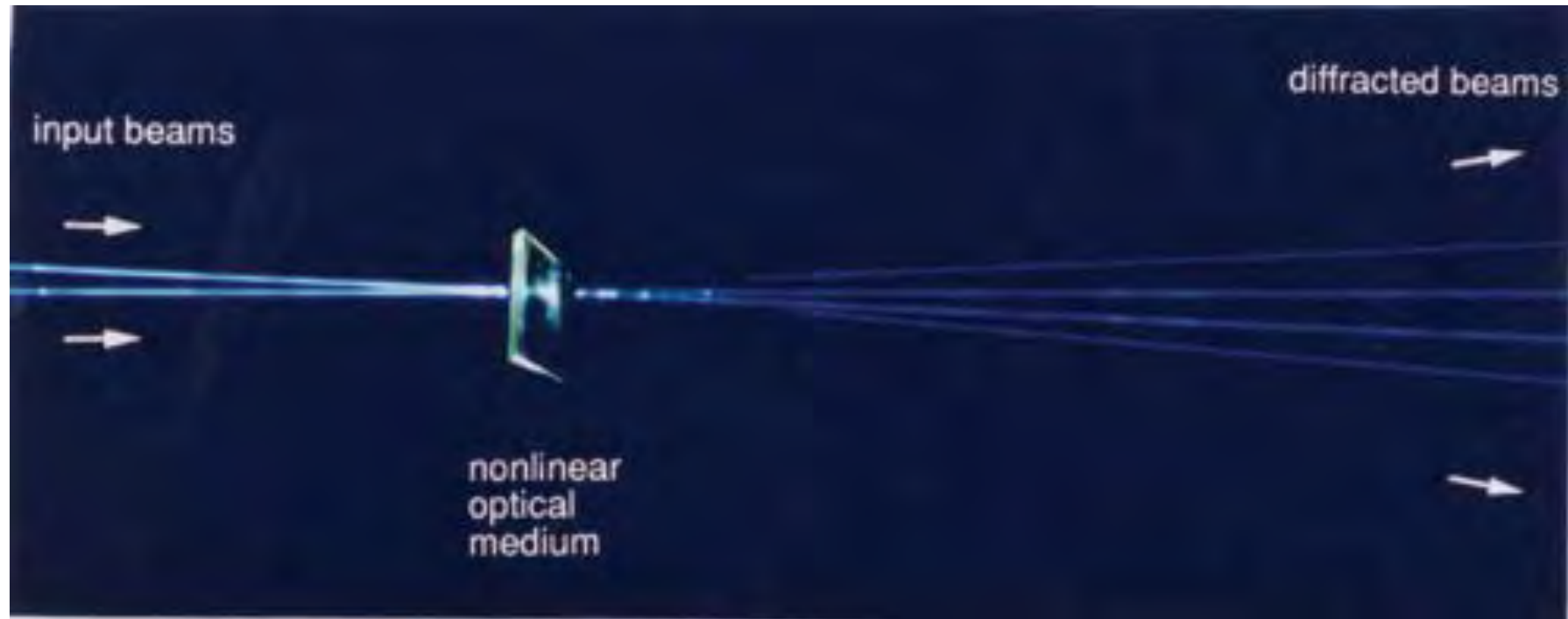
Autler-Townes Effect

Self Trapping of Light (Optical Solitons)

Stimulated Brillouin Scattering (SBS)

Research group discovered light-by-light scattering  
(the essence of photonics)

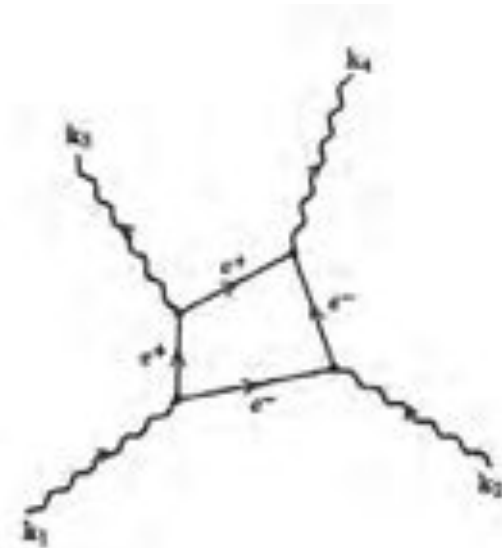
# Nonlinear Optics and Light-by-Light Scattering



The elementary process of light-by-light scattering has never been observed in vacuum, but is readily observed using the nonlinear response of material systems.

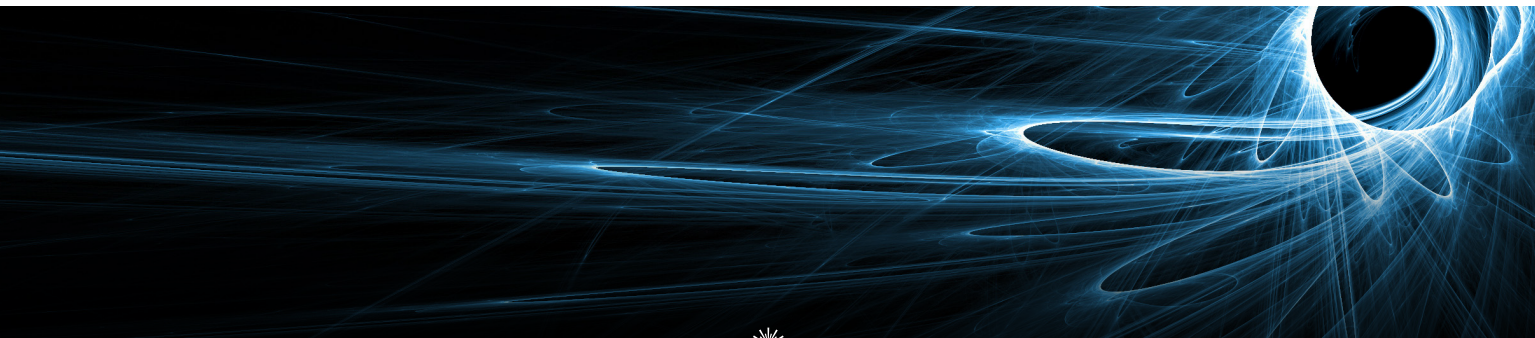
Nonlinear material is fluorescein-doped boric acid glass (FBAG)

$$n_2(\text{FBAG}) \approx 10^{14} n_2(\text{silica}) \quad [\text{But very slow response!}]$$



M. A. Kramer, W. R. Tompkin, and R. W. Boyd, Phys. Rev. A, 34, 2026, 1986.

W. R. Tompkin, M. S. Malcuit, and R. W. Boyd, Applied Optics 29, 3921, 1990.



# THE SCHAWLOW-TOWNES SYMPOSIUM ON PHOTONICS

THE SCHAWLOW-TOWNES SYMPOSIUM ON PHOTONICS IS NAMED IN HONOUR OF  
CHARLES H. TOWNES AND THE LATE ARTHUR L. SCHAWLOW, PIONEERS IN LASER TECHNOLOGY.

For this inaugural event, the University of Ottawa is delighted to present  
the following internationally acclaimed keynote speakers:



**Erich Ippen**

World-renowned expert in  
femtosecond optics, Massachusetts  
Institute of Technology



**Gerd Leuchs**

Director, Max Planck Institute for  
the Science of Light, Germany



**Charles H. Townes**

Nobel laureate in physics for  
his groundbreaking work in  
quantum electronics



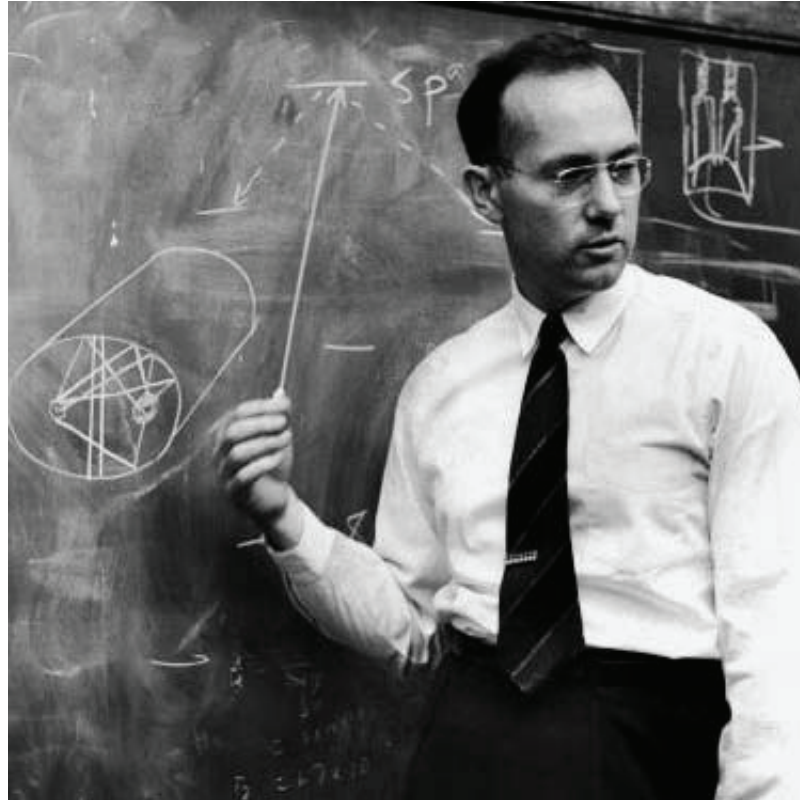
**Friday, November 9, 2012**

1 p.m. to 4 p.m.

Ottawa Convention Centre, Room 204  
55 Colonel By Drive, Ottawa, Ontario

# Charles H. Townes

July 28, 1915 to January 27, 2015



- Inventor of the maser and laser
- Nobel Prize, 1964
- Advisor to three US presidents
- Teacher, mentor, and friend



# Some Portraits

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Charles H. Townes

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