



Smithsonian

*National Museum of American History Kenneth E. Behring Center*

Guide to the William Phillips  
Innovative Lives presentation

NMAH.AC.0770

Alison L. Oswald

2001

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## Collection Overview

<b>Repository:</b>	Archives Center, National Museum of American History
<b>Title:</b>	Dr. William Phillips Innovative Lives Presentation
<b>Date:</b>	2001-04-27
<b>Identifier:</b>	NMAH.AC.0770
<b>Creator:</b>	Phillips, William, Dr., 1948- (Interviewee) Jerome and Dorothy Lemelson Center for the Study of Invention and Innovation. (Creator)
<b>Extent:</b>	1 Cubic foot (4 boxes)
<b>Language:</b>	English .
<b>Summary:</b>	Approximately 5-1/2 hours of video footage documenting an interview with Dr. William Phillips, a physicist and Nobel Laureate (Physics, 1997). Phillips discusses his background, work at the National Institute of Standards (NIST) using laser light to cool gases to the lowest temperature ever achieved, and his memories of winning the Nobel Prize.

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## Administrative Information

### Acquisition Information

Transferred to the Archives Center by the Jerome and Dorothy Lemelson Center for the Study of Invention and Innovation, May 17, 2001.

### Provenance

The collection was recorded by the Innovative Lives Program of the Jerome and Dorothy Lemelson Center for the Study of Invention and Innovation on April 27, 2001.

### Related Materials

#### **Materials in the Archives Center**

Nobel Voices Video History Project (AC0771)

### Processing Information

Processed by Alison L. Oswald, archivist, July 2001.

### Preferred Citation

Dr. William Phillips Innovative Lives Presentation, Archives Center, National Museum of American History, Smithsonian Institution.

### Restrictions

The collection is open for research use.

## Conditions Governing Use

Collection items available for reproduction, but the Archives Center makes no guarantees concerning copyright restrictions. Other intellectual property rights may apply. Archives Center cost-recovery and use fees may apply when requesting reproductions. Signed releases on file.

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## Biographical / Historical

Dr. William Phillips was born November 5, 1948 in Wilkes-Barre, Pennsylvania. He received his B.S. from Juniata College in 1970 and his Ph.D. from the Massachusetts Institute of Technology (MIT) in 1976. Phillips was awarded the Chaim Weizmann Fellowship at MIT to work on collisions and Bose-Einstein condensation (BEC) in spin-polarized hydrogen. After leaving MIT in 1978, Phillips joined the National Bureau of Standards (NBS) which was renamed the National Institute of Standards and Technology (NIST). At NIST, Phillips worked on precision measurements of the proton gyromagnetic ratio and of the Absolute Ampere. Also, he pursued laser cooling experiments which led him and colleagues Steve Chu and Claude Cohen-Tannoudji to win the Nobel Prize for Physics in 1997.

The Jerome and Dorothy Lemelson Center for the Study of Invention and Innovation was founded in 1995 at the Smithsonian Institution's National Museum of American History through a generous gift from the Lemelson Foundation. The Center's mission is: to document, interpret, and disseminate information about invention and innovation; to encourage inventive creativity in young people; and to foster an appreciation for the central role invention and innovation play in the history of the United States. The Innovative Lives series brings together museum visitors and, especially, school aged children, and American inventors to discuss inventions and the creative process and to experiment and play with hands-on activities related to each inventor's product. This collection was recorded by the Innovative Lives Program of the Jerome and Dorothy Lemelson Center for the Study of Invention and Innovation.

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## Scope and Contents

This collection contains approximately 5-1/2 hours of original (digital), master (BetaCam SP), and reference videos (VHS) documenting William Phillips, physicist and Nobel Laureate (Physics, 1997). Audience participants are students from Ormond Stone Middle School (Centreville, Virginia); Queen Anne School (Upper Marlboro, Maryland); Nysmith School (Herndon, Virginia); and Gwynn Park Middle School (Brandywine, Maryland).

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## Arrangement

The collection is organized into three series.

**Series 1, Original Videos, 2001**

**Series 2, Master Videos, 2001**

**Series 3, Reference Videos, 2001**

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## Names and Subject Terms

This collection is indexed in the online catalog of the Smithsonian Institution under the following terms:

Subjects:

Inventions -- 1980-2000  
Inventors -- 20th century  
Lasers  
Nobel Prizes  
Physicists  
Physicists -- 1930-2000  
Physics  
Slides

Types of Materials:

BetaCam SP (videotape format)  
Interviews -- 2000-2010  
Mini-DV  
Oral history -- 2000-2010  
Photographs  
Videotapes

Names:

Cater, Anita  
Chu, Steven  
Cohen-Tannouudji, Claude

Preferred Titles:

*Innovative Lives Program (NMAH public program series)*

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## Container Listing

### Series 1: Original Videos, 2001

Box 1, Video OV  
770.1

Dr. William Phillips Innovative Lives Presentation, 2001 April 27  
Notes: Camera 1

Total Running Time: 60:00

Anita Cater, Lemelson Center Education Specialist, welcomes students and provides introductory remarks. Dr. Phillips begins the program by explaining where he works, the National Institute of Standards and Technology (NIST), and what they do-maintain standards of measurement such as length, mass, voltage, and time. Discussion points that are set forth are: What does it mean to be cold? How do laser beams make things cold? What do we keep cold things in? How do we trap gases? Why make gas cold? How can we make the best clocks? Phillips discusses his background growing up in Pennsylvania and shows home movies of himself and his siblings. As a child he was curious about the world and how things worked. By showing overhead diagrams and through demonstration, Dr. Phillips explains the use of liquid nitrogen. Phillips puts flowers, a racket ball and rubber bands into a container filled with liquid nitrogen. He removes these items and demonstrates that the flowers freeze and are easily crushed, the racquet ball shatters when thrown on the floor, and the rubber bands crumble. Balloons that were placed in a container of liquid nitrogen come out flat because the warm air condensed. Liquid nitrogen is 77 degrees above absolute zero. Discussion of slowing down atoms and atoms absorbing light. Demonstration of levitron-magnet bottle-to trap atoms. Concludes by showing the first fountain clock made by NIST.

Box 1, Video OV  
770.2

Dr. William Phillips Innovative Lives Presentation, 2001 April 27  
Notes: Camera 1

Total Running Time: 60:00

Discussion continues with how to make a better and taller fountain clock. Phillips shows a diagram of an artist's conception of an atomic clock at the space station. A video of the Nobel Prize Ceremony from Stockholm in 1997 is shown. Phillips explains how the ceremony works and what it was like to receive the prize with his colleagues Steven Chu and Claude Cohen-Tannoudji. Stresses that science is not done in isolation and that he was recognized as a representative of a group. Question and answer period with the students. Questions included: Can you clarify the relationship between the levitron magnetic field and laser molasses? When did Phillips decide to become a physicist and work with lasers? What kind of classes does one take to become physicist? When one slows down

the atoms, can they be seen? Phillips emphasizes that science is an international venture.

Box 1, Video OV  
770.2

Dr. William Phillips Innovative Lives Presentation, 2001 April 27

Notes: Camera 1

Total Running Time: 60:00

English, foreign languages, writing, and speaking all help in communicating your research.

Box 1, Video OV  
770.3

Dr. William Phillips Innovative Lives Presentation, 2001 April 27

Notes: Camera 1

Total Running Time: 36:29

Tape begins with a demonstration of the levitron. Question and answer period with students. Questions include: Why was Phillips not affected by the liquid nitrogen when it was poured on his hand? When trapping atoms, does the natural frequency of the atom have anything to do with laser cooling? How does one know the atomic clock is right? How did Phillips decide to become a physicist? How did he come up with ideas to invent? Dr. Phillips gathers with a small group of students who ask more questions. Does the light of a laser refract through the cesium atom? What does have to do to get a Nobel Prize? If the atomic clock is shipped to a space shuttle, will it be assembled or disassembled? Do magnetic fields interfere with laser beams? Demonstration of Dr. Phillips pouring liquid nitrogen on the carpet.

Box 1, Video OV  
770.4

Dr. William Phillips Innovative Lives Presentation, 2001 April 27

Notes: Camera 2 (different angle)

Total Running Time: 60:00

See OV 770.1 for description

Box 1, Video OV  
770.5

Dr. William Phillips Innovative Lives Presentation, 2001 April 27

Notes: Camera 2 (different angle)

Total Running Time: 60:00

See OV 770.2 for description

Box 1, Video OV  
770.6

Dr. William Phillips Innovative Lives Presentation, 2001 April 27

Notes: Camera 2 (different angle)

Total Running Time: 34:55

See OV 770.3 for description

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## Series 2: Master Videos, 2001

Box 2, Video MV  
770.1

Dr. William Phillips Innovative Lives Presentation, 2001 April 27  
Notes: Camera 1  
Total Running Time 60:00  
See OV 770.1 for description

Box 2, Video MV  
770.2

Dr. William Phillips Innovative Lives Presentation, 2001 April 27  
Notes: Camera 1  
Total Running Time: 60:00  
See OV 770.2 for description

Box 2, Video MV  
770.3

Dr. William Phillips Innovative Lives Presentation, 2000 April 27  
Notes: Camera 1  
Total Running Time: 36:29  
See OV 770.3 for description

Box 3, Video MV  
770.4

Dr. William Phillips Innovative Lives Presentation, 2000 April 27  
Notes: Camera 2 (different angle)  
Total Running Time: 60:00  
See OV 770.1 for description

Box 3, Video MV  
770.5

Dr. William Phillips Innovative Lives Presentation, 2000 April 27  
Notes: Camera 2 (different angle)  
Total Running Time: 60:00  
See OV 770.2 for description

Box 3, Video MV  
770.6

Dr. William Phillips Innovative Lives Presentation, 2001 April 27  
Notes: Camera 2 (different angle)  
Total Running Time: 34:55  
See OV 770.3 for description

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## Series 3: Reference Videos, 2001

Box 4, Video RV 770.1	Dr. William Phillips Innovative Lives Presentation, 2001 April 27 Notes: Camera 1 Total Running Time: 60:00 See OV 770.1 for description
Box 4, Video RV 770.2	Dr. William Phillips Innovative Lives Presentation, 2001 April 27 Notes: Camera 1 Total Running Time: 60:00 See OV 770.2 for description
Box 4, Video RV 770.3	Dr. William Phillips Innovative Lives Presentation, 2001 April 27 Notes: Camera 1 Total Running Time: 36:29 See OV 770.3 for description
Box 4, Video RV 770.4	Dr. William Phillips Innovative Lives Presentation, 2001 April 27 Notes: Camera 2 (different angle) Total Running Time: 60:00 See OV 770.1 for description
Box 4, Video RV 770.5	Dr. William Phillips Innovative Lives Presentation, 2001 April 27 Notes: Camera 2 (different angle) Total Running Time: 60:00 See OV 770.2 for description
Box 4, Video RV 770.6	Dr. William Phillips Innovative Lives Presentation, 2001 April 27 Notes: Camera 2 (different angle) Total Running Time: 34:55 See OV 770.3 for description

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## Series 4: Photographs

*Box 4, Folder 1*

[Image\(s\)](#)

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