Aron Pinczuk:
The early days of light scattering in solids at Penn, the return to Argentina and the pioneering work on two-dimensional electrons at Bell Labs
During the first three decades of the 20th century, Argentina outgrew Canada and Australia in population, total income, and per capita income. By 1913, Argentina was the world's 10th wealthiest state per capita. Beginning in the 1930s, however, the Argentine economy deteriorated notably. The single most important factor in this decline has been political instability since 1930, when a military junta took power, ending seven decades of civilian constitutional government. Argentina was one of the most stable and conservative countries until the Great Depression, after which it turned into one of the most unstable. Despite this, up until 1962 the Argentine per capita GDP was higher than that of Austria, Italy, Japan and of its former colonial master, Spain.

Proceso de Reorganización Nacional

1965 - 1970

1975

1980

1985

1959-1960

Revolución Argentina  Proceso de Reorganización Nacional

40 Aniversario
24/4/1982

GUERRA DE LAS MALVINAS

La guerra de las Malvinas (en inglés, Falklands War) fue un conflicto armado entre Argentina y Reino Unido desatado en 1982, en el cual se disputó la soberanía de las islas Malvinas, Georgias del Sur y Sandwich del Sur, ubicadas en el Atlántico Sur.

Margaret Thatcher, primera ministra inglesa, dijo: “Un territorio de soberanía británica ha sido invadido por una potencia extranjera. El Gobierno ha decidido enviar una gran fuerza expedicionaria para contenerlos y reassertar la soberanía de las islas.”

A 11.000 km de las Malvinas
La flota inglesa salió de Portsmouth y se reunió con barcos que provenían de diferentes colonias británicas. Utilizaron la isla Ascensión, controlada por EE. UU., como base operativa antes de partir rumbo al Atlántico Sur.
Proceso de Reorganización Nacional

1965

1970

1975

1980

1985

Rivolución Argentina

Proceso de Reorganización Nacional

Peron

Argentine Anticommunist Alliance

Rrevolución Argentina  Proceso de Reorganización Nacional

ARGENTINA, 1985
SANTIAGO METRE
con/with Ricardo Darín, Peter Lanzani, Alejandro Fischbek, Norman Brasi

THE TRIAL OF THE JUNTAS:
RECKONING WITH STATE VIOLENCE IN ARGENTINA
BY GABRIELLE ESPARZA
ARON PINCZUK TIMELINE 1965-1985

1965

1970

1975

1980

1985

Revolución Argentina

Proceso de Reorganización Nacional

Research Assistant: 1972-73
Licenciado (Master): 1973
Ph.D. Student: 1973-75
PHILADELPHIA
1965-1971
EARLY DAYS OF LIGHT SCATTERING IN SOLIDS
(mid to late 1960s)

• FIRST OPERATING LASER (1960)
• He-Ne ION LASER (1962)
• ARGON ION LASER (1964)
• KRYPTON ION LASER (1964)

THE RAMAN SPECTRUM OF BaTiO₃
A. Pinczuk, W. Taylor, E. Burstein

Department of Physics, and Laboratory for Research on the Structure of Matter,
University of Pennsylvania, Philadelphia, Pennsylvania

and

I. Lefkowitz

Pittman-Dunn Laboratory, Frankford Arsenal, Philadelphia, Pennsylvania

(Received 22 March 1967 by E. Burstein)

The polarization of the Raman Spectrum of BaTiO₃ was studied for different scattering geometries. The frequencies and symmetries of most of the Raman active pure symmetry phonons were determined. A tetragonal symmetry was found in the vibration spectra of BaTiO₃. Two scattering geometries were used: the usual right angle geometry, and the backward scattering arrangement. The latter proved to be very useful in studying the A₁ modes. The scattered light was analyzed with a double grating monochromator designed by Dr. A. Filler of the University of Pennsylvania. The detector was a S-20 photomultiplier and the spectrum was recorded on a photographic plate at intervals of either 1.7 or 3.4 cm⁻¹ using a photon counting detector.
EARLY DAYS OF LIGHT SCATTERING IN SOLIDS (mid to late 1960s)

- FIRST OPERATING LASER (1960)
- He-Ne ION LASER (1962)
- ARGON ION LASER (1964)
- KRYPTON ION LASER (1964)
RAMAN SCATTERING BY F CENTERS

J. M. Worlock and S. P. S. Porto
Bell Telephone Laboratories, Murray Hill, New Jersey
(Received 10 September 1965)

F centers in alkali-halide crystals possess strong broad absorption and fluorescence bands in the near ultraviolet, visible, and near infrared. The breadth of these bands is characteristic of electronic transitions in the alkali halides, and is indicative of strong coupling between electrons and phonons. Much horizontal and perpendicular to the polarization of the beam. The narrow linear source of scattered radiation was focused onto the entrance slit of the spectrometer, and polarization of the Raman radiation was observed simply by inserting a polarizer in front of the entrance slit.

MULTIPLE-PHONON-RESONANCE RAMAN EFFECT IN CIS

Mike V. Elings and S. P. S. Porto
Department of Physics and Department of Electrical Engineering,
University of Southern California, Los Angeles, California 90007
(Received 15 January 1969)

As discussed in the text, we cannot distinguish free and bound excitons in this experiment.

Present work. We find $\omega_1 = 323$ cm$^{-1}$, $\omega_2 = 500$ cm$^{-1}$. We have also been informed of similar observations in Irb (A. Pinczuk, private communication).

EFFECT OF STATIC UNIAXIAL STRESS ON THE RAMAN SPECTRUM OF SILICON

E. Anastassakis, A. Pinczuk and E. Burstein
Physics Department and Laboratory for Research on the Structure of Matter, University of Pennsylvania, Philadelphia, Pa. 19104
and
F. H. Pollak and M. Cardona
Physics Department, Brown University, Providence, Rhode Island
(Received 1 December 1969 by E. Burstein)
1960s

APS March Meeting mid 1980s
ARGENTINA (1971-1975)

ATOMIC ENERGY COMMISSION

UNIVERSITY OF BUENOS AIRES

Member of the Scientific Staff
1971-1975

Lab Director
1973-1974

Chair, Department of Physics
April-October 1974
1970

Rivolució Argentina

1975

Atomic Energy Comission

Eduardo Fradkin
Lab Director
1973-1974

Susana Vaizman

Jorge Hirsch
Chair, Department of Physics
April-October 1974

Pedro Eggarter
'SOFT' OPTICAL PHONONS AND THE MORPHOTROPIC PHASE TRANSITION OF THE Pb(Ti_{1-x}, Zr_{x})O_{3} SYSTEM

A. Pinczuk

Dpto. de Instrumentación, Comisión Nacional de Energía Atómica, Avenida del Libertador 8250, Buenos Aires S.29, Argentina

(Received 16 August 1972; in revised form 19 January 1973 by E. Burstein)

Raman Spectra of Polycrystalline Solids; Application to the PbTi_{1-x}Zr_{x}O_{3} System*

Gerald Burns and Bruce A. Scott
IBM Watson Research Center, Yorktown Heights, New York 10598
(Received 24 August 1970)

Raman Spectra of Polycrystalline Solids; Application to the PbTi_{1-x}Zr_{x}O_{3} System*

Gerald Burns and Bruce A. Scott
IBM Watson Research Center, Yorktown Heights, New York 10598
(Received 24 August 1970)

SOFT E( TO) PHONONS AND THE PHASE TRANSITION OF THE Pb(Ti_{1-x}, Zr_{x})O_{3} AND (Pb_{1-3x/2}, La_{x})TiO_{3} SYSTEMS

R. Merlin, A. Pinczuk and J. A. Sanjurjo

Com. Nac. de Energía Atómica, Buenos Aires, Argentina

(Received December 3, 1975)
Scattering of Light by Crystals

William Hayes
Rodney Loudon

1978

Third International Conference
Light Scattering in Solids
JULY 28 - AUGUST 1, 1975

M. Balkanski
Lattice Dynamics
International Conference
Paris
September 1977

FLAMMARION SCIENCES

Argon Ion Laser

Spex 1403

Jarrell-Ash 25-300

Laser Wavelength Chart
NATO ARW: Light Scattering in Semiconductor Structures and Superlattices
Mont Tremblant, Québec, Canada (1990)
The ‘Disappeared’ from the Atomic Energy Commission during the Dirty War 1976-1983

RAMAN SCATTERING BY Wavevector Dependent Coupled Phasmon - LO Phonons of n-GaAs
A. Pinczuk*, G. Abstreiter, R. Trommer and M. Cardona
Max-Planck-Institut für Festkörperforschung, D-7000 Stuttgart 80, Federal Republic of Germany
(Received 20 January 1977 by M. Cardona)


COUPLED PLASMON-LO PHONON MODES AND LINDBERG-MERMIN DIELECTRIC FUNCTION OF n-GaAs
G. Abstreiter*, R. Trommer**, M. Cardona
Max-Planck-Institut für Festkörperforschung, Heisenbergstr. 1
7000 Stuttgart 80, Federal Republic of Germany
and
A. Pinczuk*
Bell Telephone Laboratories, Holmdel, N.J. 07733, U.S.A.
Received: March 25, 1979, by M. Cardona


RESONANCE ENHANCEMENT OF RAMAN SCATTERING BY ELECTRON-GAS EXCITATIONS OF n-GaAs
A. Pinczuk*
Bell Telephone Laboratories
Holmdel, New Jersey 07733
G. Abstreiter, R. Trommer, and M. Cardona
Max-Planck-Institut für Festkörperforschung
Heisenbergstrasse 1, 7000 Stuttgart 80, F.R.G.
Received March 2, 1979 by M. Cardona

The room temperature Raman spectra of PtTi$_{1-x}$Zr$_x$O$_2$ at hydrostatic pressures up to 68.5 kbar indicate three phase transitions. At 57.5 kbar a new phase appears, most probably the monoclinic high-temperature phase, $Pm\overline{1}m$, which is in coexistence with the low-temperature phase $Fm\overline{1}3m$. Between 8 and 9 kbar the relative intensity of additional structures appears. It is likely that this change is due to an antiferroelectric phase. A further transition between 26.7 and 24 kbar is not supported by the present data. The temperature dependence of the additional structures in the $Pm\overline{1}3m$ phase of PtTi$_{1-x}$Zr$_x$O$_2$ seems to show non-linear behavior.

1. Introduction

The correlation between structural phase transitions and the growth of interest in and novel materials has led to the development of novel materials with potential applications in electronic and optical devices. One such material is ferroelectric materials, which are of particular interest due to their unique properties, such as the ability to switch between two stable states.

Below the paraelectric-ferroelectric phase transition, the material is isotropic with rhombohedral BaTiO$_3$ structure. At lower temperatures, the so-called $Fm\overline{1}3m$ phase, there is in addition to the ferroelectric distortion a staggered rotation of the oxygen octahedrons around the (111) axis. For compositions $0.94 < x ≤ 1.0$ the material becomes antiferroelectric with orthorhombic structure.

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2) 7000 Stuttgart-80, BBD.
3) Present address: IBM Thomas J. Watson Research Center, P.O. Box 218, Yorktown Heights, New York 10598, USA.
4) Weizmann Institute of Physics, Hebrew University, Jerusalem.
THE MADRID CONNECTION
THE MADRID CONNECTION

APS March Meeting 1999

1991

(ICPS-24) Jerusalem, 1998


• Dr. Honoris Causa, UAM (1997)
Aron Pinczuk worked as a Visiting Scientist at IBM Research in Yorktown Heights 1977-1978. He was a member of the Technical Staff at Bell Telephone Laboratories (renamed AT&T Bell Laboratories in 1984 and then Lucent Technologies in 1996) during 1978-1998.

**Resonance enhanced Umklapp Raman processes in GaAs-GaAs\(_2\),Al\(_3\):**


IBM Thomas J. Watson Research Center
Yorktown Heights, New York 10598

(Received 21 September; in revised form 8 November 1977, by R. Merlin)

We report the observation of umklapp Raman scattering of phonons with wavevector of 2π in superlattices with period d, due to resonances enhancements at transitions from valence 1 minima. We also observed, for the first time, minima formation in the spin-orbit split 44π

**Raman scattering in superlattices: Anisotropy of polar phonons**

R. Merlin

Coordinated Science Laboratory and Materials Research Laboratory, University of Illinois at Urbana-Champaign, Urbana, Illinois 61801

C. Cobden

Department of Physics and Materials Research Laboratory, University of Illinois at Urbana-Champaign, Urbana, Illinois 61801

M. V. Klein

Department of Physics, Materials Research Laboratory and Coordinated Science Laboratory, University of Illinois at Urbana-Champaign, Urbana, Illinois 61801

H. Moriz

Coordinated Science Laboratory and Department of Electrical Engineering, University of Illinois at Urbana-Champaign, Urbana, Illinois 61801

A. Y. Cho

Bell Laboratories, Murray Hill, New Jersey 07974 and Coordinated Science Laboratory, University of Illinois at Urbana-Champaign, Urbana, Illinois 61801

A. G. Gostello

Bell Laboratories, Murray Hill, New Jersey 07974

(Received 28 June 1979; accepted for publication 17 October 1979)

Raman experiments on polar phonons in GaAs-Ga\(_2\),Al\(_3\) superlattices are rephased data from the literature, and its interpretation in terms of folding of the phonon Brill and scattering from q≠0 phonons induced by electronic zone folding, are discuss alternative explanations for the observed minima in the anisotropy induced by layering. 7 results show good agreement with experiment.
We report the observation, by resonant inelastic light scattering, of intersubband excitations of the multilayer two-dimensional electron gas, in modulation doped GaAs-AlGaAs heterojunction superlattices. These are the first measurements of these transitions by any technique, and furnish intersubband energies in good agreement with calculated values. The spectral bands are broad, and nearly Lorentzian in shape: the implied relaxation rates scale linearly with band energy and are significantly faster than transport relaxation rates. Finally, the polarized spectra reveal differences between spin-flip and non-spin-flip excitations which are unique to multilayer two-dimensional electron gases.

FIG. 1: (a) Model of the conduction band edge of modulation doped heterojunction superlattices. (b) Schematic diagram of conduction and valence subbands, showing the optical transitions contributing to light scattering near the $E_k = A_k$ resonance. (c) Calculated subband energy levels for sample 1.
Light Scattering Determinations of Band Offsets in Semiconductor Heterostructures

J. Menéndez and A. Pinczuk

Abstract: Inelastic light scattering is used to determine the band offsets in semiconductor heterojunctions. The conduction band discontinuity is obtained from energy level splittings measured in inelastic light scattering spectra of phosphorus-doped GaAs-AlGaAs heterostructures. The method has been applied to GaAs-AlxGa1-xAs and GaAs-Ga1-xAlxAs heterojunctions. This paper reviews the light scattering determinations of band offsets. These results are compared with those obtained from low energy electron spectroscopy and transmission measurements. The impact of the light scattering results on chemical trends and the influence of strain in the band lineup problem.

1982

Plasma dispersion in a layered electron gas: A determination in GaAs-(AlGa)As heterostructures

Diego Oliva and A. Pinczuk
Bell Laboratories, Holmdel, New Jersey 07733

A. C. Gossard and W. Wiegmann
Bell Laboratories, Holmdel, New Jersey 07733

Revised 30 April 1982

The dispersion of the plasma frequency of layered electron gas in GaAs-(AlGa)As heterostructures was determined by inelastic light scattering. The measured dispersions differ from that in two and three-dimensional plasmas. They are lower in the in-plane components of the wave vector. This observation confirms predictions of theoretical models.

1988

Observation of Magneto-plasmons, Rotons, and Spin-Flip Excitations in GaAs Quantum Wires

A. R.勤, A. Pinczuk, J. S. Weiner, B. S. Dennis, L. N. Pfeiffer, and R. W. West
AT&T Bell Laboratories, Murray Hill, New Jersey 07974

Inelastic light scattering spectra of the one-dimensional electron gas in GaAs quantum wires embedded in a strong perpendicular magnetic field show long-wavelength collective excitations and display analogy structures that indicate the magneto-negativity of plasma. The observed shift of the 2D plasma frequency is consistent with the predictions of theory. The magneto-negativity is further shown by the appearance of bright structures in the inelastic light scattering spectra. The frequency and intensity of the 2D plasma frequency is shown to be strongly dependent on the perpendicular magnetic field for the case of large, low-temperature, and low-magnetic-field quantum wires.

1992

THE ARGENTINA CONNECTION
ARON PINCZUK