How do things evolve in the universe? How are particles accelerated in the universe?

Professor Petrosian’s research covers many topics in the broad area of theoretical astrophysics and cosmology, with a strong focus on high-energy astrophysical processes.

Cosmological studies deal with global properties of the universe, where the main focus is the understanding of the evolution of the universe at high redshifts, through studies of the evolutions of population of sources such as galaxies and quasars or active galactic nuclei, gamma-ray bursts, using new statistical techniques developed in collaboration with Prof. B. Efron of the Department of Statistics. Another area of research is the use of gravitational lensing in measuring mass in the universe.

High-energy astrophysics research involves interpretation of non-thermal astronomical sources where particles are accelerated to very high energies and emit various kinds of radiation. These processes occur on many scales and in all sorts of objects: in the magnetosphere of planets, in the interplanetary space, during solar and stellar flares, in the accretion disks and jets around stellar-size and super-massive black holes, at centers of galaxies, in gamma-ray bursts, in supernovae, and in the intra-cluster medium of clusters of galaxies. Plasma physics processes common in all these sources for acceleration of particles and their radiative signature is the main focus of the research here.

ACADEMIC APPOINTMENTS
• Professor, Physics
• Professor, Applied Physics

ADMINISTRATIVE APPOINTMENTS
• Teaching Assistant, Cornell University, (1961-1961)
• Research Assistant, CRSR, Cornell University, (1962-1967)
• Research Association, CRSR, Cornell University, (1967-1967)
• Research Fellow, California Institute of Technology, (1967-1969)
• Visiting Scientist, IOTA Cambridge, (1969-1969)
• Assistant Professor, Stanford University, (1969-1971)
• Associate Professor, Stanford University, (1972-1979)
• Professor, Stanford University, (1980- present)
• Iranian National Fellowship, National Iranian American Council, (1958-1962)
• Industrial Fellowship, Cornell University, (1963-1964)
• Fellowship, Alfred P. Sloan Foundation, (1972-1974)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS
• Consultant, Kitt Peak National Observatory (1971 - 1971)
• Member, Arcetri, Florence (1982 - 1983)
• Member, National Optical Astronomy Observatory (NOAO) (1982 - 1983)
• Member, Nordita, Copenhagen (1982 - 1983)
• Member, Cornell University (1982 - 1983)
• Member, Observatoire de Meudron, France (1989 - 1990)
• Member, Space Telescope Science Institute (1996 - 1996)
• Member, National Optical Astronomy Observatory (NOAO) (1998 - 1998)
• Member, Institute of Advanced Studies, Bochum University (2000 - 2000)
• Member, Eta Kappa Nu, IEEE
• Member, Tau Beta Pi, The Engineering Honor Society
• Member, Royal Astronomical Society
• Member, International Astronomical Union
• Member, American Astronomical Society

PROFESSIONAL EDUCATION
• Ph.D., Cornell University (1967)
• M.S., Cornell University (1963)
• B.E.E., Cornell University (1962)

LINKS
• ADS abstracts: https://ui.adsabs.harvard.edu/search/q=Petrosian%2C%20Vahe&sort=date%20desc%2C%20bibcode%20desc&p_.=0
• arXiv astro-ph: http://www.arxiv.org/find/astro-ph/1/au:+OR+petrosian_vahe+petrosian_v/0/1/0/all/0/1

Teaching

COURSES

2022-23
• Introduction to Stellar and Galactic Astrophysics: PHYSICS 160, PHYSICS 260 (Win)

2021-22
• Introduction to Stellar and Galactic Astrophysics: PHYSICS 160, PHYSICS 260 (Win)

2019-20
• Introduction to Stellar and Galactic Astrophysics: PHYSICS 160, PHYSICS 260 (Win)
STANFORD ADVISEES

Orals Evaluator
Anirudh Prabhu

Doctoral (Program)
Jadyn Anczarski, Danielle Brown, Jhonnatan Gama Vazquez, Sadaf Kadir, Sidney Mau, Mati Mebratu, Mikhail Molodyk, Marta Nowotka, Emrys Peets, Aidan Reilly, Josephine Wong, Shuo Xin

Publications

PUBLICATIONS

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• Hard X-Ray Emission from Partially Occulted Solar Flares: RHESSI Observations in Two Solar Cycles
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  Effenberger, F., Da Costa, F. R., Oka, M., Saint-Hilaire, P., Liu, W., Petrosian, V., Glesener, L., Krucker, S.
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• PARTICLE ACCELERATION IN SOLAR FLARES AND ASSOCIATED CME SHOCKS
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• DATA-DRIVEN RADIATIVE HYDRODYNAMIC MODELING OF THE 2014 MARCH 29 X1.0 SOLAR FLARE
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• THE FIRST FERMI LAT SUPERNOVA REMNANT CATALOG
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  Ackermann, M., Ajello, M., Albert, A., Atwood, W. B., Baldini, L., Ballet, J., Barbiellini, G., Bastieri, D., Bechtol, K., Bellazzini, R., Bissaldi, E., Blandford, R. D., Bloom, E. D., Bonino, R., Bottacini, E., Bregeon, et al
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• 2FHL: THE SECOND CATALOG OF HARD FERMI-LAT SOURCES
  ASTROPHYSICAL JOURNAL SUPPLEMENT SERIES
  Ackermann, M., Ajello, M., Atwood, W. B., Baldini, L., Ballet, J., Barbiellini, G., Bastieri, D., Gonzalez, J. B., Bellazzini, R., Bissaldi, E., Blandford, R. D., Bloom, E. D., Bonino, et al
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• FERMI OBSERVATIONS OF HIGH-ENERGY GAMMA-RAY EMISSION FROM GRB 090217A ASTRONOMICAL JOURNAL LETTERS
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Petrosian, V., Chen, Q.
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