We could determine the structure of diamond-anvil cell technology more like a movie than a snapshot. Before, linear motions of molecules, making high-pressure physics, "says Conradi. "For years, the cumbersome rigs used to perform many different experiments with two small diamonds," he says. To avoid cracking the diamonds, the Washington University physicists use flawless gems, each one-quarter of a carat. They add another material, a ruby chip, to measure pressure. With these tools, the team has generated pressures over 100,000 times that of the earth's atmosphere at sea level. Employing a home-made NMR apparatus connected to the diamond-anvil cell by coaxial cables, the physicists have also been able to chart the molecular diffusion of hydrogen under pressure.

In diamond-anvil cell physics, a common way to examine a sample is by X-ray diffraction, an analysis made by passing X-rays through the crystal structure of materials and registering the scattering, or diffraction, image of the rays. But, unlike X-ray diffraction, the NMR technique does not provide any information of motion — only atomic locations.

The NMR signals — the response of the protons in the sample to the magnetic field exerted by the NMR magnet — are played out on a spectrometer — a sophisticated radio receiver and transmitter. The scientists are able to infer the diffusion and rotation of molecules from the spin signals they see. The data from the event can be transferred from the NMR screen to a computer, eventually yielding a plot of molecular diffusion and rotation in terms of pressure and temperature.

The diamond-anvil cell technique is young, the brainchild of physicists in the '50s. Under the enormous pressure generated by the force exerted between the two diamonds, the electrons in the atoms of a substance become excited, the atoms and the properties of the substance — color, density, susceptibility to a magnetic field, electrical resistance, for example — change significantly. Hydrogen, a gas at room temperature, can become solid at room temperature under the intense pressure of the diamond-anvil cell.

The diamond-anvil cell and its paraspherical can fit into the palm of a hand; the NMR apparatus is so small that when held between index finger and thumb, it resembles a rather crude designed earring. Yet the device is 10 times more efficient than a several-ton hydraulic press in reaching pressures that approximate those believed to be at the core of the earth and hydrogen-rich planets like Jupiter, Saturn, Uranus and Neptune.

Thus, geologists and planetary scientists don't need the imagination of a Jules Verne to ponder the center of the earth and other planets. Such knowledge of the earth's interior is still largely theoretical, based on observations near the earth's surface and seismic data. The theoretics on other planets come largely from extraterrestrial samples and mathematical extrapolation.

"To better understand the interior of Jupiter," Conradi says, "scientists are now able to use a diamond-anvil cell."

Lee, Conradi and Norberg place the diamonds on either side of a metal gasket. A sample, say of hydrogen, the most common element in the universe, and a staple of NMR analysis, is trapped in a hole that has been drilled through the gasket. The two diamonds are pressed against each other by the force from a small screw. The liquid is then squeezed down, generating the extremely high pressure.

High-pressure physicists commonly refer to the pressures they reach in terms of "atmospheres." An atmosphere is considered to be the pressure at sea level. The maximum pressure

Best view yet

With the meticulous skill and precision of watchmakers, high-pressure physicists at Washington University have fused two technologies into one package, providing scientists with a unique tool to examine matter under ultra-high temperature and pressure.

Using diamond-anvil cell technology, a method of applying extremely high pressure between two tiny, opposing diamonds, physicists and chemists have been able to study the dynamics of substances under the extraordinary pressure assumed to be at the center of the earth and other planets. It also has potential in industry where scientists may be able to develop better synthetic polymers by passing X-rays through the crystal structure of materials and registering the scattering, or diffraction, image of the rays. But, unlike X-ray diffraction, the NMR technique does not provide any information of motion — only atomic locations.

The NMR technique eventually will allow earth and planetary scientists, for instance, their best view yet of the dynamics of substances under the extraordinary pressure assumed to be at the center of the earth and other planets. It also has potential in industry where scientists may be able to develop better synthetic polymers by passing X-rays through the crystal structure of materials and registering the scattering, or diffraction, image of the rays. But, unlike X-ray diffraction, the NMR technique does not provide any information of motion — only atomic locations.

A technique long used in physics and chemistry, NMR allows scientists to examine molecules by measuring magnetic fields detected by the nuclei of atoms. More recently, NMR has found many applications in medicine, where the tracking of molecules gives doctors a real life picture on a computer screen of the body's organs and the chemical processes within them.

"The addition of NMR to the diamond-anvil cell method strengthens the chemical processes within them. The diamond-anvil cell technology more like a movie than a snapshot. Before, linear motions of molecules, making high-pressure physics, "says Conradi. "For years, the cumbersome rigs used to perform many different experiments with two small diamonds," he says. To avoid cracking the diamonds, the Washington University physicists use flawless gems, each one-quarter of a carat. They add another material, a ruby chip, to measure pressure. With these tools, the team has generated pressures over 100,000 times that of the earth's atmosphere at sea level. Employing a home-made NMR apparatus connected to the diamond-anvil cell by coaxial cables, the physicists have also been able to chart the molecular diffusion of hydrogen under pressure.

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Writer Gerald Early receives prestigious Whiting award

Gerald L. Early, Ph.D., assistant professor of English and African and Afro-American studies, has been awarded the prestigious $25,000 Whiting Writer's Award from the New York-based Whiting Foundation. The awards, which are given unconditionally, recognize writing potential and achievements.

Early is one of 10 writers from across the country to receive the 1988 Whiting Writer's Award. The other winners are Michael Burkhart, Lydia Davis, Bracy Duffy, Jonathan Federn, Mary La Chapelle, Li-Young Lee, Sylvia Moss, Geoffrey O'Brien and William Vollmann.

The foundation does not accept applications for the award. Candidates are proposed by nominees appointed by the foundation. A small committee of writers, literary scholars and editors then reads the candidates' works before selecting the winners. The foundation's nominees and selectors serve anonymously. This is the fourth year of the awards.

Early, who has been a member of the University faculty since 1982, specializes in 19th-century American literature and 19th- and 20th-century Afro-American literature with emphasis on the Afro-American autobiography, slavery, the social and cultural history of jazz, and sports literature. He has lectured on these topics and has published many essays, reviews and poems.


Early's other works in progress will focus on jazz in Kansas City, Mo., America's sportswomen and political aspects of American slavery, and the late writer Richard Wright.

In addition to the selectors for the Whiting Writer's Award, other faculties have applied Early's work to the 1990 Goodwill Games, the book will feature seven American essayists and seven Soviet essayists, each writing about a specific aspect of his or her culture. Early's essay will be on American sports.

Among the other American writers to be included in the book are Joy Doctor, Sandra Cisneros and Gene D. Ward. All of the writers have had work...Continued on p. 3
School of Fine Arts. Garber will display the show's opening from 3-5 p.m. ton University will host a reception for the gallery.

The Gallery of Art will display the Faculty art show opens Nov. 13.

Diamonds are valued in high-pressure physics because they are transparent and the hardest material used in science. Their transparency allows easy passage of light and X-rays; thus, they serve as a window to the sample. A tiny spec of ruby is placed inside the diamond-anvil cell to measure the pressure in the cell. An intense beam of blue light from a laser directly above the diamond-anvil cell interacts with the atoms of the ruby. Once the laser hits the ruby, its strong deep red fluorescence creates a short wavelength spectrograph that charts wavelengths. These are measured in angstroms, units of wavelengths known at atmospheric pressure; the shift in wavelength reveals the pressure on the ruby.

The Washington University researchers had to handle a couple of key obstacles before putting the technology to work: the researchers can only work with samples of about 50 micrograms, 2,000 times smaller than the usual NMR sample; and the metallic gasket that holds the sample acts as a shield, covering the sample nuclei from the NMR antenna.

To resolve both problems, graduate student Lee designed a hairpin rf coil. The coil can only fit samples of about 50 micrograms, 2,000 times smaller than the usual NMR sample; and the metallic gasket that holds the sample acts as a shield, covering the sample nuclei from the NMR antenna.

The production also will travel to the St. Louis Science Center in Forest Park.

The bears are seeded second in the regional behind the host school, which is ranked second nationally.

In order to compiling a school record 925 winning percentage, the Bears reeled off victories in their first 26 matches, and have defeated top-20

The Bears, who concluded the regular season with a 35-2 record and a number-three ranking in the Division III national poll, have received an invitation to participate in the NCAA Tournament. Regional play begins Nov. 10 at University of Wisconsin- Whitewater. The Bears are seeded second in the regional behind the host school, which is ranked second nationally.

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Memorial service is set for Albert Levi

A memorial service for Albert William Levi, Ph.D., Distinguished Lecturer in German Studies at the University of Pennsylvania, is set for Tuesday, November 21 at 7:30 p.m. in the University Center. Director of German Studies at the University, Professor William J. Haas, will serve as speaker.

Dr. Levi, who joined the University's German Studies Program in 1947, was known for his extensive contributions to the field of German Studies. He received his doctorate from the University of Chicago in 1938 and later served as a visiting professor at the University of Pennsylvania in 1939 and 1940.

Dr. Levi was a prominent figure in the German Studies community, and his contributions to the field were widely recognized. He served as a visiting professor at several institutions, including the University of California, Berkeley, and the University of California, Los Angeles.

Dr. Levi's research focused on various aspects of German literature and culture, and he was a respected scholar in the field. He was a member of several academic organizations, including the American Philological Association and the Modern Language Association.

Dr. Levi is survived by his wife, Ute, and five children.

The exhibition will later be shown at the Saint Louis Art Museum.

David J. Pittman, Ph.D., professor of sociology, recently was re-appointed to a three-year term on the Missouri Advisory Council on Alcohol and Drug Abuse. Pittman has been on the council since 1986. The council advises the state Division of Alcohol and Drug Abuse on needs and services.

Robert H. Salisbury, Ph.D., Sociologist and member of the Department of Sociology and Philosophy, was recently appointed to the Missouri Advisory Council on Alcohol and Drug Abuse. Salisbury has been on the council since 1986. The council advises the state Division of Alcohol and Drug Abuse on needs and services.

Eagleton serves on two U.S. commissions.

The following is an alphabetical listing of new Hilltop faculty and administrative staff appointments, as of October 1, 1988. The new appointments list, compiled by the faculty records office, will continue to be published in the Washington University Record over the next few weeks.

The Washington University Record will help program faculty and staff scholarly or professional activities, including appointments, current research and teaching activities, earned degree, current title and department along with membership to any professional activity or activity in which faculty and staff are noteworthy.

Have you done something noteworthy?

Do you have a paper or presentation that is noteworthy?

Do you have something else noteworthy?

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Lectures

Thursday, Nov. 10
4 p.m. Dept. of Mechanical Engineering Colloquium, "Wave Propagation in Fully Elastic Media," Brian D. N. Davey, the Irwin L. and Meta E. Dukas Chair and Distinguished Professor in the Division of Engineering, Center for Geophysical and Planetary Sciences, Texas Tech University, Lubbock, Texas. 118 Dabney Hall.

5 p.m. Public Affairs Thursday Lecture, "Laser Ablation Printing of 3D Structures: Force, Hall Possible?" Harvey Segaloff, Dept. of Political Science, CUNY Graduate Center, and visiting at the Central European University, Budapest, Hungary. "Laser Ablation Printing of 3D Structures: Force, Hall Possible?" Harvey Segaloff, Dept. of Political Science, CUNY Graduate Center, and visiting at the Central European University, Budapest, Hungary. 118 Dabney Hall.

Thursday, Nov. 17
2:30 p.m. Dept. of Mechanical Engineering Colloquium, "Interactions of Normal Shocks With Turbulent Boundary Layers," Mikhail Suhov, David Fellow, McDonnell Douglas Research Laboratories, St. Louis, and WU affiliate professor. 118 Dabney Hall.

4 p.m. Dept. of Chemistry Seminar, "Triplet State as a Diagnostic Probe in Model Photosynthetic Systems," Hans Lehn, professor, physical chemistry dept., The Hebrew U. of Jerusalem, Israel. St. Louis Science Center.

4:30 p.m. Dept. of Mathematics Colloquium, "Proper Maps of Balls," John P. D'Angelo, U. of Illinois as Urbana-Champaign. 102 Dabney Hall.

Friday, Nov. 18

Saturday, Nov. 19

10 a.m. Music, Steinberg Hall, lower gallery. 10 a.m. to 5 p.m. weekends. 3 p.m. to 5 p.m. weekdays. "Video: Form and Performance." Tropp will perform works by "late Romantic" composers, including works of Debussy and Richard Strauss. Free admission. "Video: Form and Performance." Tropp will perform works by "late Romantic" composers, including works of Debussy and Richard Strauss. Free admission. 1914 Delmar.

Sunday, Nov. 20

Thursday, Nov. 24
7:30 p.m. Conference on Workers' Self-Organization, "The Land That Was the Land of the Southern Tenant Farmer Unions." (Rescheduled from Nov. 10.) General admission for both outside conference films is $3; WU employees and students, $2 and free to those who register for the conference.

Saturday, Nov. 26