
September 2004

Rock River Valley Section

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Event

Sense

The Institute of Electrical and Electronic Engineers, Inc.

RRVS Section and IAS Chapter Meeting

Lunar Helium-3 and Fusion Power

When TUESDAY, September 28, 2004

Where

Hong Kong Buffet (815-397-8810), 5456 E. State St., Rockford, next to Circuit City.

Agenda

6:00 PM Social
6:30 PM Dinner
7:30 PM Presentation

Program

This talk will discuss a wide range of applications of fusion energy, from producing radioisotopes for nuclear medicine to generating electric power to propelling fusion rockets. The talk will focus on fusion using an advanced fuel, the combination of deuterium with helium-3 (D-3He), a fuel that burns with more difficulty but relaxes some engineering constraints compared to deuterium-tritium (D-T) fuel, the presently leading candidate. Protons from D-3He reactions recently have been used in UW experiments to produce ^{13}N , a radioisotope useful for positron emission tomography (PET) scans. If the experiment is fueled with D-T or pure deuterium, the resulting neutrons can be used

to detect clandestine materials, such as chemical explosives or highly enriched uranium. Looking farther into the future, electricity production using D-3He fuel appears to be a promising approach, and related physics, engineering, safety, and environmental issues will be examined. A key difficulty is the relative lack of ^3He fuel on Earth, where a sufficient ^3He resource exists for a substantial engineering test program, but not for a fusion economy. Researchers at the UW Fusion Technology Institute, including the speaker, proposed in 1986 that the Moon's near-surface soil contains about a million tonnes of economically recoverable ^3He , an estimate that holds true today. Lunar ^3He mining techniques and issues will be discussed, as will the application of D-3He fuel to fusion space propulsion which, if successfully developed, would open the Solar System to human exploration and development.

Speaker

John F. Santarius is the Plasma Engineering Group Leader at the Fusion Technology Institute, and a Senior Scientist in the Engineering Department at the University of Wisconsin—Madison. In 1979 he received a PhD in Physics



from the University of Texas at Austin, and in 1973 he received a BS in Physics from the California Institute of Technology.

Meal/Reservations

Dinner will be a buffet at the Hong Kong Buffet. Please make your **dinner reservations** by **calling Ginger at 815-394-5696 or sending her an email (ginger.spinasanta@hs.utc.com) by Friday, September 24, at 5pm**. Please include the following information: your name, phone number, email address, and IEEE member number. Dinner is \$5 for members, \$2 for student members, \$11 for non-members and \$5 for non-member students. Unemployed members may call one of the officers for special arrangements.

Note

The meeting is open to the general public. You need not be an IEEE member. Guests are welcome. However, please call to enable us to make appropriate arrangements.

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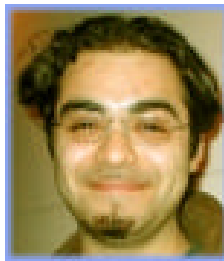
Northern Illinois University Student Branch Officers



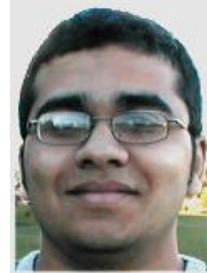
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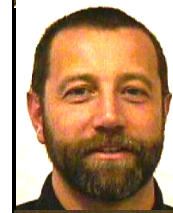


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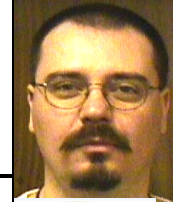
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Calendar

September NIU Meeting September 23

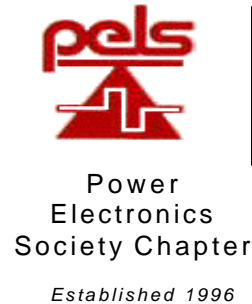
"International Space Station: Transitional Platform for Moon and Mars" by Dr. Michael Greenisen, NASA Spacestation Life Science Scientist, 5:30-7:00pm, NIU Barsema Hall Auditorium

September RRVs Section Meeting September 28

"Lunar Helium-3 and Fusion Power" at Hong Kong Buffet, next to Circuit City in Rockford

October RRVs Section Meeting October 28

"Advances in High Efficiency Interior Permanent Magnet Motor Drive" at **Rock Valley College**



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