"МИС-РТ"-2022 Сборник №79-1-16-1 http://ikar.udm.ru/mis-rt.htm

# Перспективные направления в развитии физики LENR

Проф. НИУ МЭИ Климов А.И.

Москва, Вэбинар Зателепина В.Н., 01.06.2022

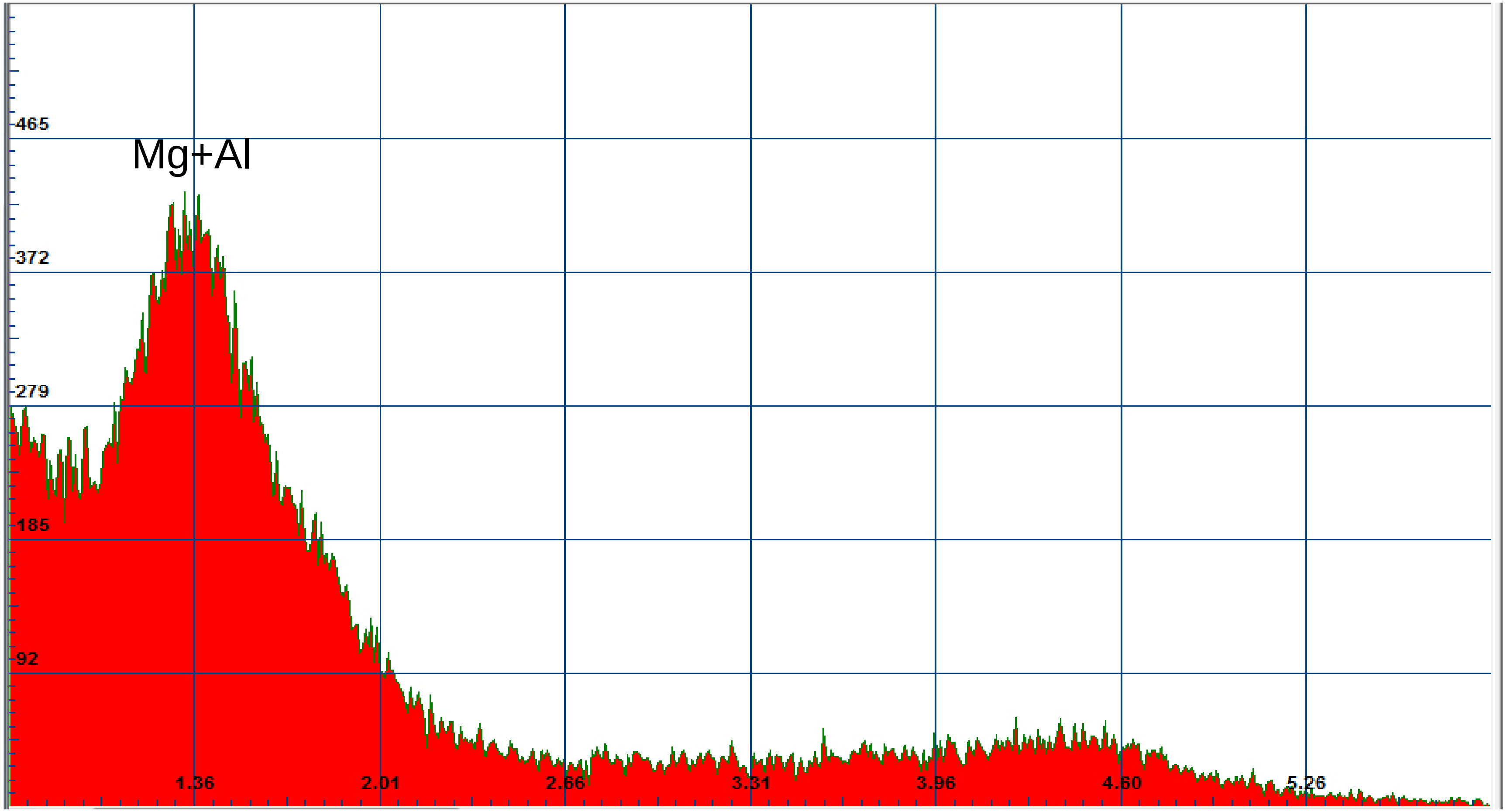
# Основные экспериментальные результаты в физике LENR

1. Выделение значительной *удельной тепловой энергии* с величиной **q~ 1-30 КэВ/атом Ме или Н** (Iwamura&colleagues, Климов А., и др.). **Намного выше типичных значений в любой хим. реакции**

2. *Значительная интенсивность жесткого УФ-излучения и мягкого X-ray излучения*, в десятки раз превышающая суммарную интенсивность оптического излучения гетерогенной плазмы (R. Mills, А. Климов, А. Карабут, и др.). Тормозное излучение? **Излучение из возбужденных внутренних электронных оболочек трансмутированных элементов**

3. *«Трансмутация» химических элементов ????* **Синтез + распад или просто синтез????**

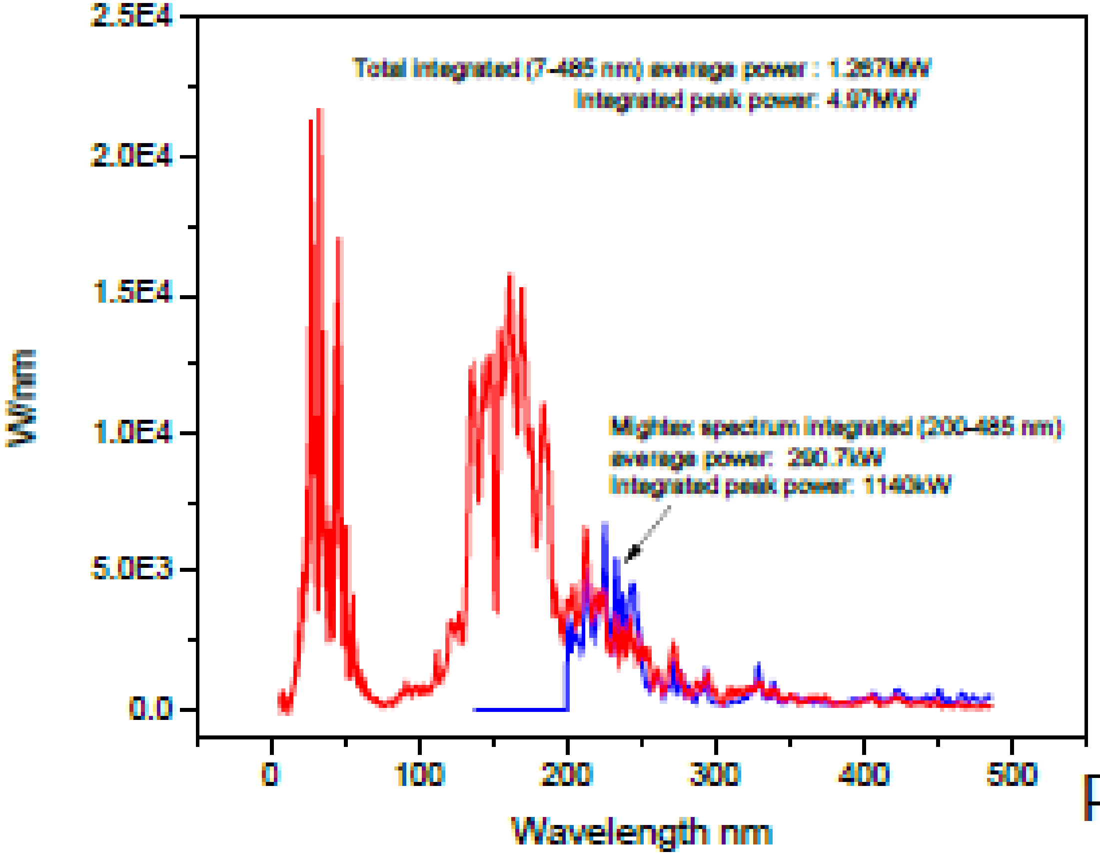
# X- Radiation from Heterogeneous Plasma in PVR




The combined discharge (DC+HF), a mean power - 500W, *the hot electrode –cathode*

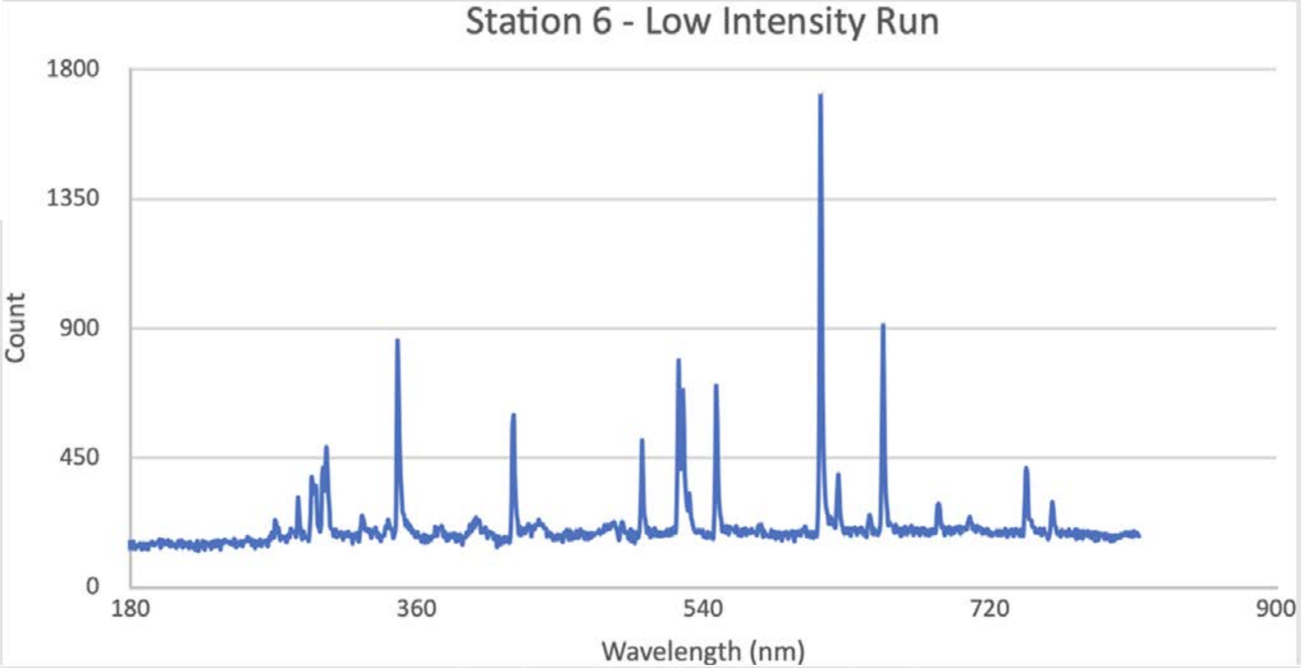
brilliant
LIGHT POWER

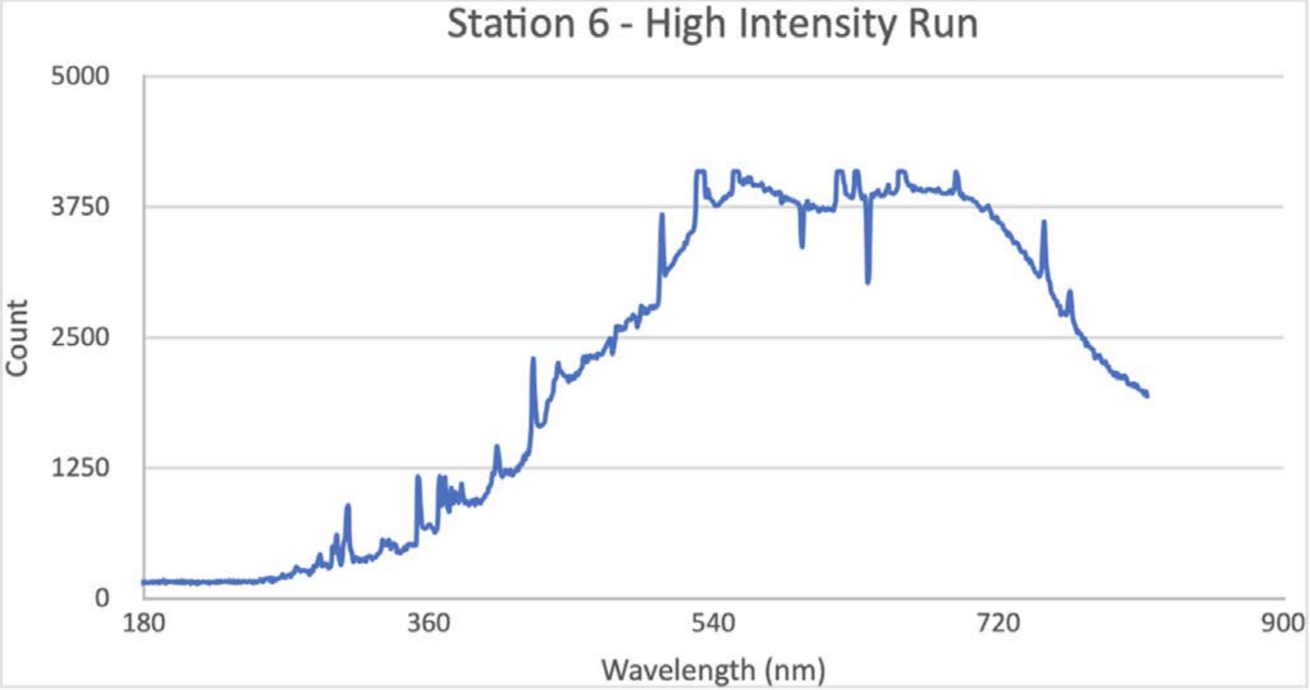
# Plasma Emission
# (Power Calibrated Spectrum)



# SUNCELL® OPTICAL POWER MEASUREMENTS

Optical power or radiation transfers power at 10 to 100 times the power per area compared to conduction and convection of combustion and nuclear power plants. The 3000-5000K SunCell® plasma emits radiation at a power density of 4.6 to 35 MW/m2, corresponding to an extraordinary 150 kW to 1.14 MW, respectively, transmitted through an 8-inch diameter



# Основные экспериментальные результаты в физике LENR

1. *Что необходимо для реализации LENR?*
- **Н-атомы и ионы**,
- Металлы типа Pd, Ni, и др.. Лучше всего **нано-кластеры Ме**

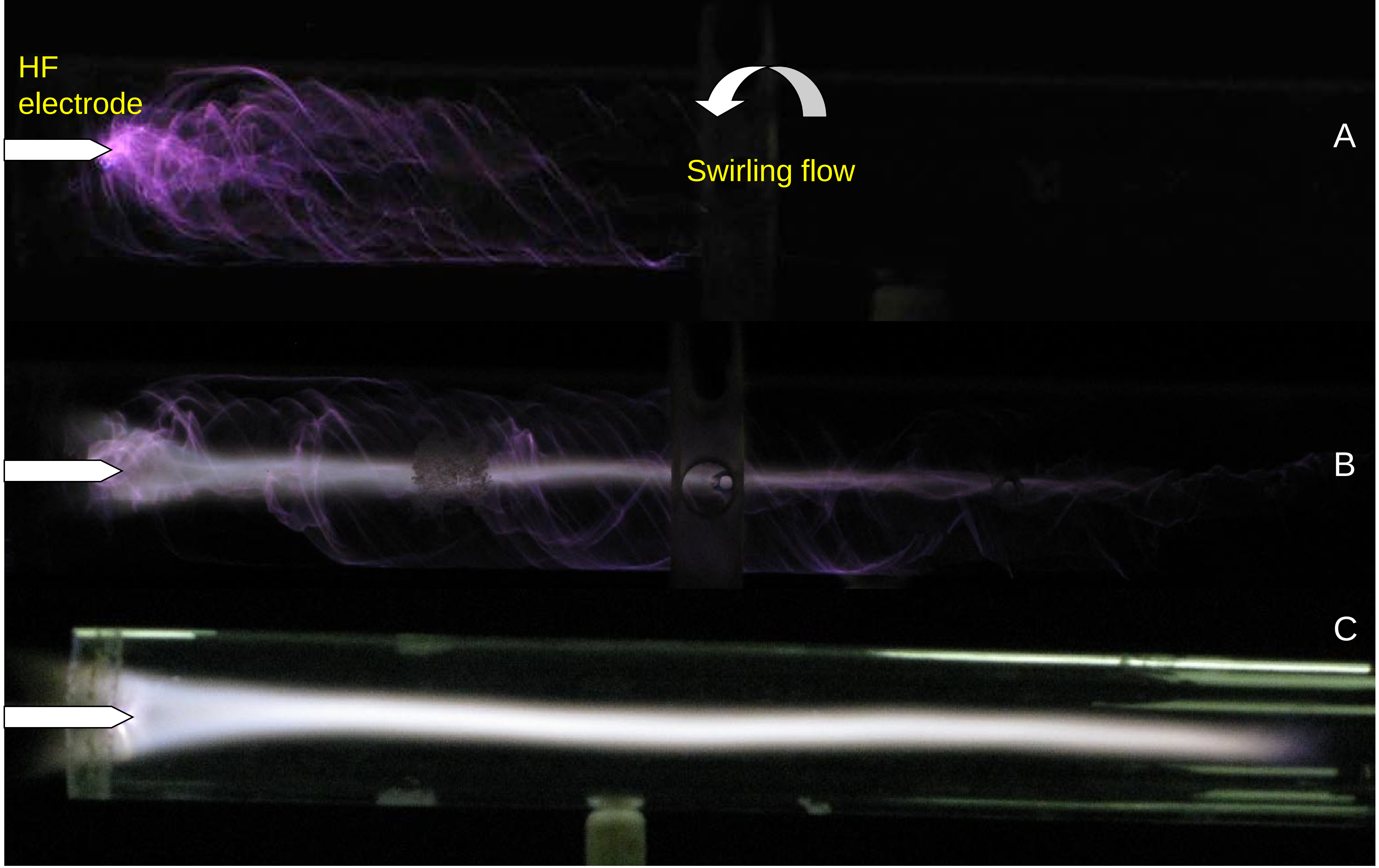
2. *Источники возбуждения*:
- давление и нагрев,
- кавитатор,
- плазма,
- рентген,
- E- beam, и др.???? (Солин, Протон-21)
- Или еще что- то другое???

# Основные экспериментальные результаты в физике LENR

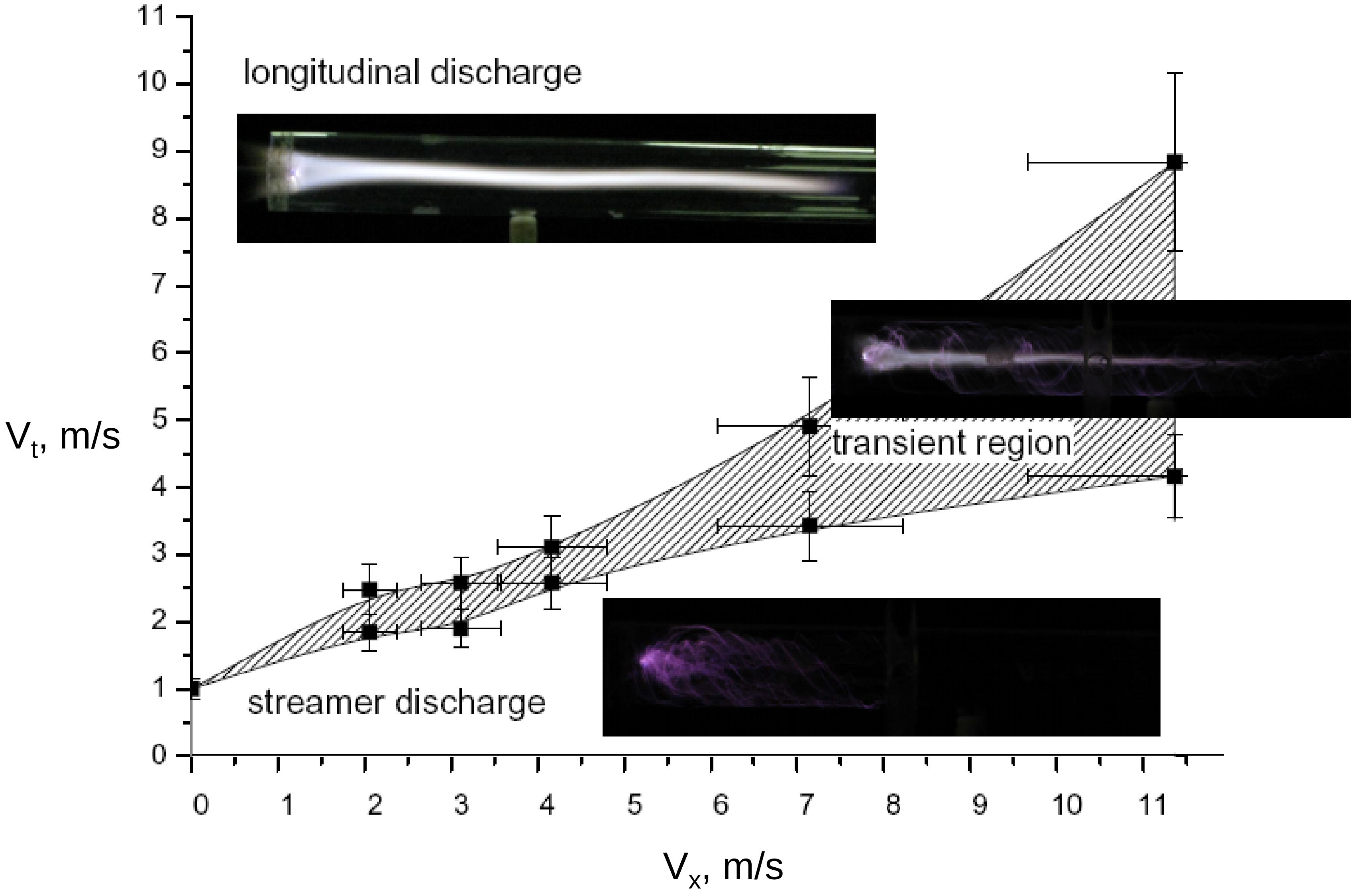
1. **Стыковка результатов по физике ШМ и LENR**

(Капица П., К. Шаулдерс, Месяц Г., Мацумото, Климов А., результаты по созданию СВЧ- оружия в СССР)

- **«УФ- катастрофа»**
- **Трансмутация элементов**
- **Треки « странного излучения» и природа и динимика катодных и анодных пятен**
- **Проблемы в энергетическом балансе плазмоида**




**Different regimes of different LP creation by CHFD plasma.** *Pulse duration t=1ms, modulation frequency $F_M$=500Hz, $P_{st}$ =1 Bar. A- HF streamer corona discharge; B- transient regime; C- stable LP creation regime*




**LP regimes at different vortex parameters.** *Pulse duration $T_i$=1ms, modulation frequency $F_M$=500Hz, $P_{st}$ =1 Bar.*

# Основные экспериментальные результаты в физике LENR

*Два важных поисковых направления в физике LENR*:

1. **Создание нейтроно-подобных частиц** (типа гидрино, экранировка протонов и др.)
2. **Создание спаренных электронов (бозонных пар)** за счет магнитных сил на комптоновском расстоянии при энергиях сталкивающихся электронов с металлической мишенью Е> Екв~ 3,73 КэВ (Екв ~α $M_eC_2$).

*Наиболее значимые теоретические **«находки»:***

1. Наличие необъясненной значительной ***экранировки*** протонов КэВ- энергий в атомах металлов ( работы Касаги, Русецкого А., К. , NASA, L. Forsly, K. Cherski)
2. Работы по ***туннелированию протонов*** (работы Цыганова Г., Киркинский В., NASA и др.
3. ***Двух-ядерный атом*** (Работа Гуревича & коллег)
4. ***Гидринное состояние водорода*** (Р. Миллс)
5. ***Полые атомы*** (С. Пикус) ***и металлический водород*** (L. Holmlid, Шведы&Исландия)

*ISSN 1063-7842, Technical Physics, 2009, Vol. 54, No. 2, pp. 159–164*.

A. F. Ioffe Institute of Russian Academy of Sciences,
Saint Petersburg 194021, Russia

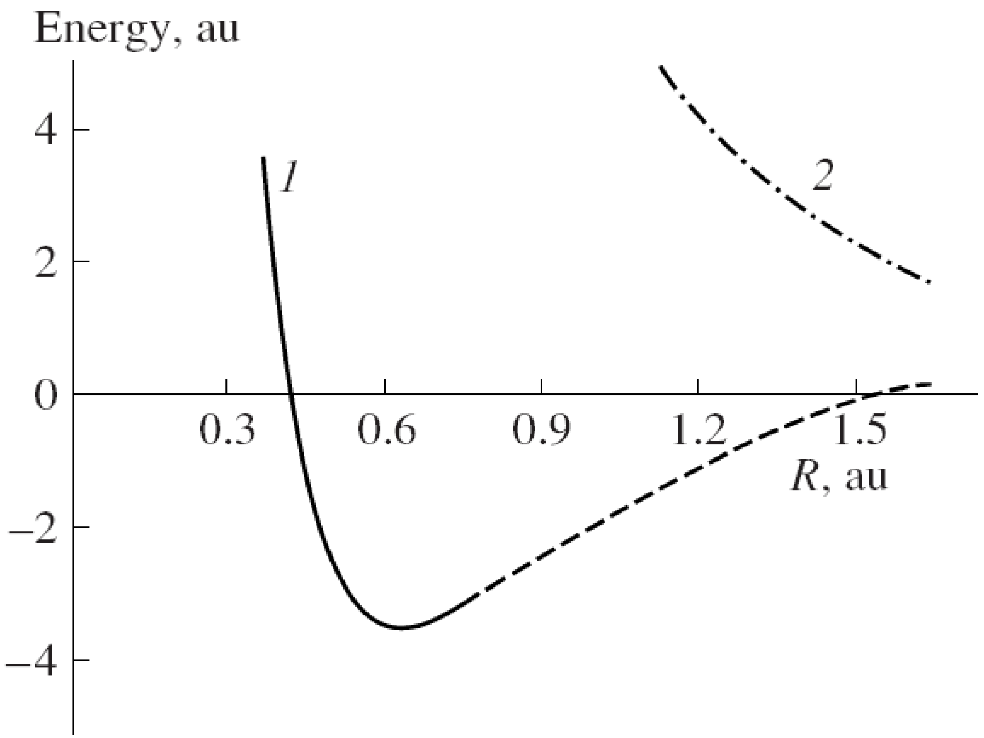
# Binuclear Atom as the Bound State of a Proton and a Heavy Atom

V. P. Chalyi, V. L. Gurevich, and M. Yu. Pogorelsky

The existence of a bound state of a proton and a heavy atom is predicted.

The atom is described by the Thomas–Fermi method. The electrons screen the field of the proton, which suppresses the repulsive force between the proton and the atomic nucleus. On the other hand, the force of attraction between the proton and the electrons is directed along the electron density gradient (i.e., towards the nucleus). It is concluded that for $Z= 80$, the two forces are balanced at a distance from the nucleus of about ***0.6 of the Bohr radius***. It is found that the potential energy minimum of the proton with a depth of ***several tens of electron volts*** lies in the range of negative energies (attraction). It is proposed that such a system be referred to as a binuclear atom. It is emphasized that, in contrast to molecules, in which binding with the hydrogen atom is ensured by a rearrangement of the states of the outer-shell (valence) electrons, a binuclear atom is formed as a result of the collective response of the system of inner electrons to the proton potential.

The distance between the nucleus and the bound proton (≈0.3 Å for *Z* ≈ *80) is much smaller than the* characteristic size of the wave functions of valence electrons. This means that the chemical behavior of such a system after adjoining an extra electron to neutralize it must resemble the behavior of an ***atom with atomic number Z + 1.***



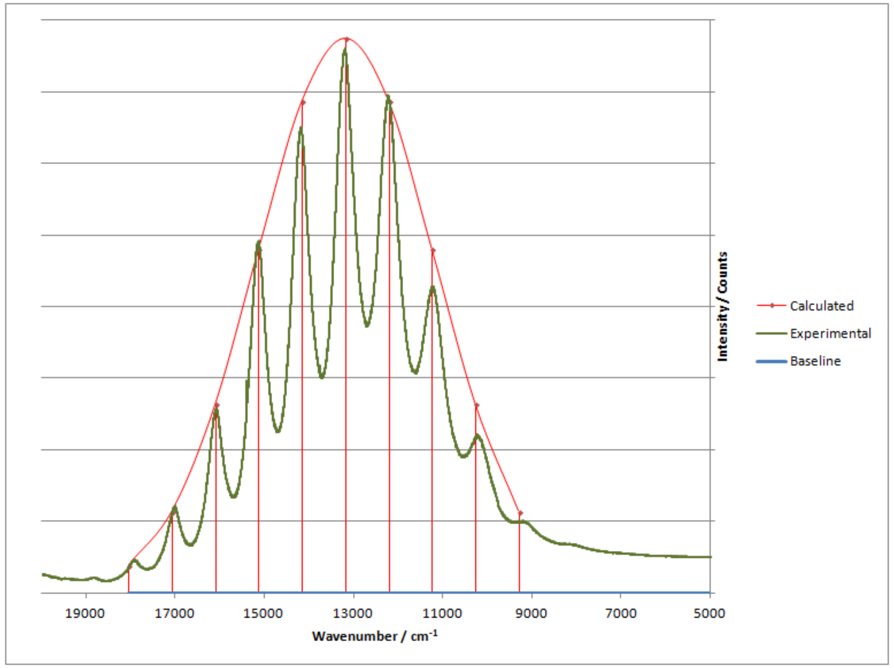

Potential energy of the proton–heavy atom system as a function of distance: curve *1* describes the energy of the proton–heavy atom system ($Z = 80$) as a function of distance $R$ between the proton and the nucleus; curve *2* is potential $\Phi(R)$. The dashed curve shows one of possible versions of a dependence intermediate between *1* and *2*.

brilliant
LIGHT POWER

For more information please visit us at www.brilliantlightpower.com

[redacted]

# Methods for measuring Hydrino® product




- GUT
- Molecular modeling
- H(1/2) and H(1/4) hydrino transitions observed by continuum radiation
- Astronomy data verifying hydrinos such as H(1/2), H(1/3), and H(1/4) hydrino transitions
- H (1/4) spin-nuclear hyperfine transition
- Hydrino trapped on witness plates and in alkali halide-hydride crystals
- Polymeric molecular hydrino compounds
- In situ $H_2$ (1/4) gas synthesis in argon and analysis

[redacted]

- $H_2$ (1/4) ro-vib spectrum in crystals by e-beam excitation emission spectroscopy
- $H_2$ (1/4) X-ray photoelectron spectroscopy (XPS) binding energy
- $H_2$ (1/4) Fourier Transform Infrared (FTIR)
- $H_2$ (1/4) Inverse Raman effect (IRE)
- $H_2$ (1/4) Photoluminescence spectroscopy
- Electron Paramagnetic Resonance Spectroscopy (EPR)
- Time of Flight Secondary Ion Mass Spectroscopy (ToF-SIMs) and Electrospray Ionization Time of Flight (ESI-ToF) identification of hydrino compounds
- MAS H NMR
- Thermogravimetric analysis (TGA)
- Cryogenic gas chromatography
- Fast H in plasma including microwave and rt-plasmas
- Rt-plasma with filament and discharge
- Afterglow
- Highly pumped states
- H inversion
- Commercial differential scanning calorimetric (DSC) and water flow calorimetry with multiple solid fuels chemistries
- Arbin-Instrument measured electricity gain over theoretical in CIHT cells
- SunCell® fully ionized energetic plasma and electromagnetic pulse
- 20 MW extreme ultraviolet NIST-calibrated optically measured power in shot blasts
- Commercial bomb calorimetry of energetic shots
- Shock wave 10X TNT

# HOH-Argon E-beam Emission
# Hydrino $H_2(1/4)$ Ro-vibrational P Branch

Of the noble gases, argon uniquely contains trace hydrino gas due to contamination during purification. Argon and oxygen co-condense during cryo-distillation of air and the oxygen is removed by reaction with hydrogen on a recombination catalyst such as platinum whereby hydrino is formed during the recombination reaction due to the subsequent reaction of HOH catalyst with H. The known peaks are H I, O I, $O_2$ bands. The unknown peaks match molecule hydrino ($H_2(1/4)$ P branch) with no other unassigned peaks present in the spectrum.

P(3)
P(2)
P(4)
P(5)
P(1)
$O_2$ bands