

On the Heat Transfer in LENR Experiments

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Assumptions:

- 1) There exist a (yet unknown) mechanism explaining
 - how low energy nuclear reactions can take place even though the interparticle distances are large compared to the nuclear distances
 - and how the energy released is transferred to heat without penetrating radiation
- 2) The released energy thermalises within a submicron scale (of the order of 100 nm)

Thermal diffusion equation

Diffusion constant:

Dulong-Petit law:

Solution of the diffusion equation

$$(\quad) \frac{(\quad)}{(\quad)}$$

Assume:

$$(\quad) \quad (\quad)$$

$$(\quad) \quad \text{---} \quad (\quad)$$

$$(\quad) \frac{(\quad)}{\sqrt{(\quad)}} \left[(\quad) \quad (\quad) \right]$$

Repeated reactions

- Assume that the temperature inside the sphere of the radius r_0 increases by the same amount repeatedly after every time interval t_0

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Central temperature

- $\frac{1}{\sqrt{2\pi}} \frac{1}{\sqrt{t}}$

- $\left(\frac{1}{\sqrt{2\pi}} \frac{1}{\sqrt{t}} \right) \left\{ \frac{1}{\sqrt{2\pi}} \frac{1}{\sqrt{t}} \left(\frac{1}{\sqrt{2\pi}} \frac{1}{\sqrt{t}} \right) \left(\frac{1}{\sqrt{2\pi}} \frac{1}{\sqrt{t}} \right) \left(\frac{1}{\sqrt{2\pi}} \frac{1}{\sqrt{t}} \right) \frac{1}{\sqrt{2\pi}} \frac{1}{\sqrt{t}} \right\}$

Continuous power

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$$\left\{ \overline{\sqrt{\quad}} - \left(\overline{\sqrt{\quad}} \right) \right\}$$

$$\left\{ \overline{\sqrt{\quad}} \frac{(\quad)(\quad)}{(\quad)} \left(\overline{\sqrt{\quad}} \right) \right\}$$

$$(\quad) -$$

Calculation of the maximum power

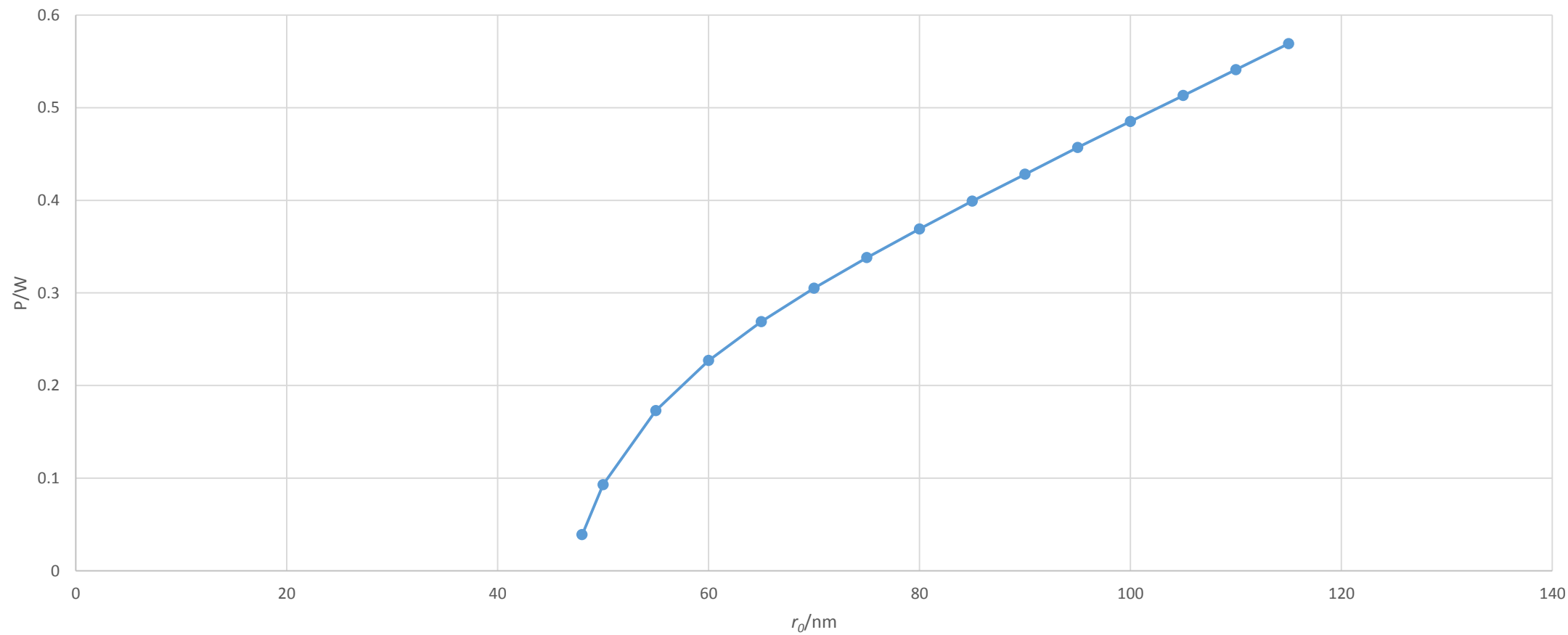
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- $$\frac{P_{max}}{P_{avg}} = \left\{ \frac{P_{max}}{P_{avg}} \frac{P_{max}}{P_{avg}} \left(\frac{P_{max}}{P_{avg}} \right) \right\}$$

—

Maximum power



Consequences/Conclusions

- Provided that the LENR mechanism allows the released energy to thermalise within a submicron scale (of the order of 100 nm), the thermal conduction allows continuous power to exist
- Power up to order 1 W can originate from one single spot
- Surface studies may have rather limited values
- Result may be used to restrict possible theoretical models and possible initial energy carriers (i.e. phonons, photons, electrons, deuterons, protons)

Thank you for your attention!