IPB Reactor COP Calculation

March 1, 2017

Definition

$Hpdrop:$ heater power drop after power deposit to the core in watts

V_1 : voltage RMS measured at the core entrance when Q-pulse

V_2 : voltage RMS measured at the core exit when Q-pulse

V_3 : voltage RMS measured across the RF termination resistor at the end of the transmission line. The termination resistors are mounted in a copper block that is water cooled . It has constant RF impedance in the freq range we are operating in. With this method we can measure the pulse current directly by measuring V_3 and knowing the R_{term} resistance, $I = V_3/R_{term}$

P : power deposit to the core either by DC or Q-pulse in watts
in Q-pulse

$$P = \frac{(V_1 - V_2) * V_3}{R_{term}} \tag{1}$$

$V^2 = (V_1 - V_2)^2$ when Q-pulse or voltage drop when DC

$$R = \frac{V^2}{P} \; [volts^2/watts], [volts^2/watts] = [ohms] \tag{2}$$

Where R is the resistance of the core at a given core temperature.

$$M = \frac{Hpdrop}{P} \tag{3}$$

Where M is the ratio of Hpdrop vs. power DC or power Q-pulse at a given core temperature.
Note: M vs. temperature is an approximately second order correlation.

COP Estimation

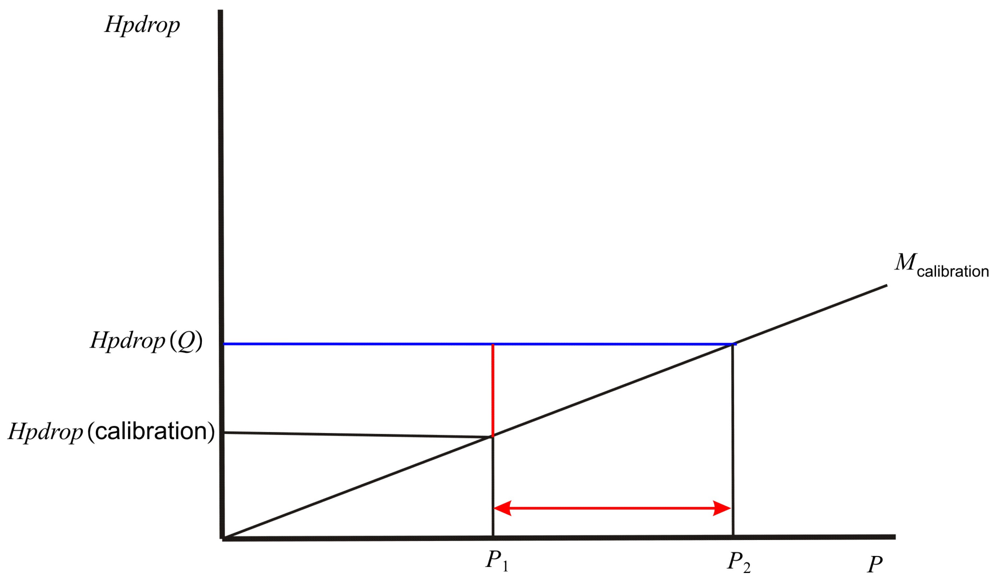

Figure 1: Hpdrop vs. P

At a given core temperature

From the Figure 1
P_1 is stimulated power from DC or Q-pulse
P_2-P_1 is stimulated power gain or LENR (Low Energy Nuclear Reaction) Power

COP is Coefficient Of Performance

$$P_2 = \frac{Hpdrop(Q)}{M_{calibration}} \tag{4}$$

$$COP = 1 + \frac{P_2 - P_1}{P_1} = \frac{P_2}{P_1} = \frac{Hpdrop(Q)}{M_{calibration} * P_1} \tag{5}$$

COP calculation of ipb1-30b and sri-ipb2-27b are in Figure 2 and Figure 3.

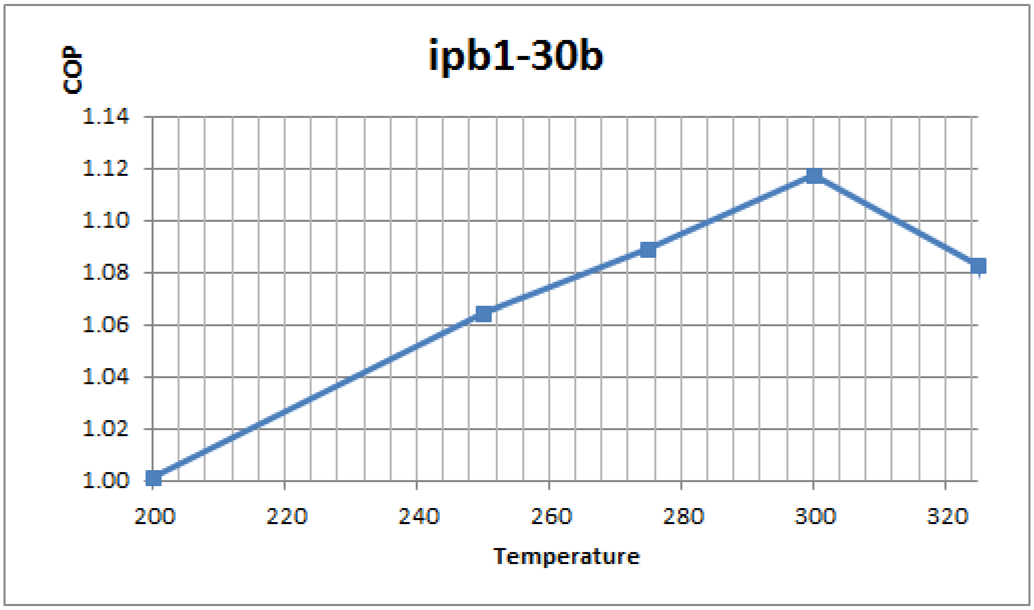

Figure 2: COP vs. temperature of ipb1-30b

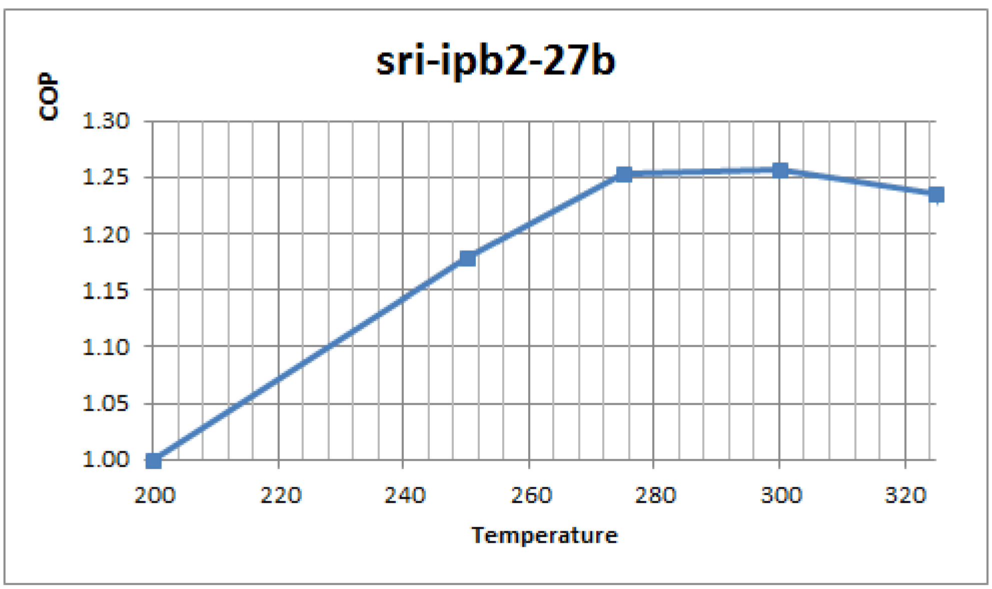

Figure 3: COP vs. temperature of sri-ipb2-27b