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(Mrs.) P. JAYASIMHA

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 HOMI BHABHA ROAD, BOMBAY-5

167  
 28, 29, 30,  
 26, 27, 31, 1, 2, 3, 4, 5  
 3, 4  
 0.35—  
 P. K. Verma



Bombay,  
10th March '69

Dear Dr. Verma,

Thank you very much for your valuable comments. I can prove to you that the solutions found by me are the only possible equilibriums. I will do so in person when I come to Ahmedabad either in the last week of March or in early April according to your convenience. As to the stability analysis, I agree it deals only with a certain class of perturbations viz., those for which the perturbed distribution function  $f^{(x,v,t)}$  obeys  $\frac{1}{f} \frac{df}{dx} = ik(x)$ . The velocity dependence of  $f$  has thus been restricted. Since there is no other way I can think of just now, to deal with the problem, these provide at least necessary conditions. If you have gone through the manuscript by now, you will have found that I keep BOTH frequency and local wave number as complex. What I have done then is to make use of the fact that the frequency is independent of  $x$  so that all the equations are written at a convenient point

viz. a maxima or minima of the equilibrium potential. Here three different cases are distinguished viz., (i)  $n_1 + n_2 \neq 0$  and  $k_1 = k_2 = \text{real}$  (ii)  $n_1 + n_2 = 0$  and  $k_1 + k_2 = 0$  (iii)  $n_1 + n_2 = 0$  and  $\Omega^2 y^2 + k_1 k_2 (y^4 - E) = 0$ , all quantities taking on values corresponding to the maxima (or minima, as the case may be) of the equilibrium potential.

Cases (i) and (iii) give only definite values to  $k_1$  and  $k_2$  whereas case (ii) involves continuous values for  $k_1$  (or  $k_2$ ). We can get a necessary condition for real frequencies at all values of  $k_1$  (or  $k_2$ ) in case (ii). This severely restricts the equilibria that can be stable. A spatial analysis has not been done yet since search for an equilibrium that gives real frequencies in all the three cases is still on.

Please let me know what are the formalities needed for me to come and see things for myself. Has anyone joined at all yet? It would be convenient for me if you can arrange for my coming (preliminary visit, that is) sometime between 25th March and 6th April approximately.

Since Prof. P. L. Bhatnagar is not in Bangalore just now (abroad somewhere) I have to see him only later i.e. after April. In the meantime, I want to use all my accumulated vacation and earned leave here from next month onwards and bring my daughter to stay with us for a short while before all the three go our different ways. If I can get some job in Bangalore I would prefer that, even at lesser pay, for the sake of my daughter. Bombay riots hold a lesson - avoid places where there is linguistic chauvinism, which includes Gujarat also! You must be becoming a Gujarati yourself by now, who knows? So, I better shut my mouth here only before I make some unpalatable remarks.

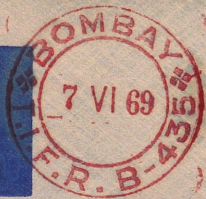
Hope your family is keeping fine and getting ready for the summer.

yours sincerely,

P. Jayasimha.

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BY AIR MAIL  
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Dr R. K. Verma,

Physical Research Laboratory,

Navarangpura, नवरंगपुरा

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P. Jaysimha

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7th June '69

Dear Dr. Verma,

Thank you very much for your prompt reply. I was surprised myself that you are going away this year itself. Where are you going to exactly and for how long (if it is not a secret)? I am myself interested in going to USA next year. I have just to write to the concerned Professor (of Plasma Physics) stating my interests and giving suitable references, is it not? Or, do I have to do anything else too? I do not know any of the big shots myself, but I do have a good certificate from Thompson.

You state that the status quo will be maintained if I join PRL. You know I am still an R.A. II here and so, that means I will continue as such there. Of course, Dr. Das must be the equivalent of a fellow here. Do you think I should still come as an R.A. II only? I do not mind a lesser salary but it may then be better for me to join as a lecturer somewhere. Can you please talk to the people there and find out on my behalf regarding what I will get?

People here expect me to go as soon as possible. I am going to talk to Udgaonkar after I hear from you again. Anyway I have to leave the Institute earlier if I have to go out next year (they have a 5 year bond).

It is not possible for me either to continue life as it is in Bombay. My husband does not want to pay brokerage etc. for a flat in Colaba or somewhere nearby. I spend three hours per day travelling and after that working at home, cooking, washing and what not. At the end of the day I get so tired of life and I do not understand to what purpose I am doing all this, ~~for~~. You may not believe it but my husband would rather I go to Ahmedabad or somewhere than pester him daily about the need for a flat in Colaba etc. I therefore think it best that I decide about my place of work independent of where my husband happens to be, as long as I have to earn my living. So that is it.

Monsoon has started here now and the dust and grime in the air is being washed out for a while. Expecting your reply soon,

yours sincerely,  
P. Jaysimha.



Dr. Ram K. Varma,

Physical Research Laboratory,

Navarangpura,

Ahmedabad-9.

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Gujerat State.

P. Jayasinha  
Theoretical Physics Section.

TATA INSTITUTE OF FUNDAMENTAL RESEARCH  
HOMI BHABHA ROAD, BOMBAY - 5



POST OFFICE OF SINGAPORE  
SINGAPORE

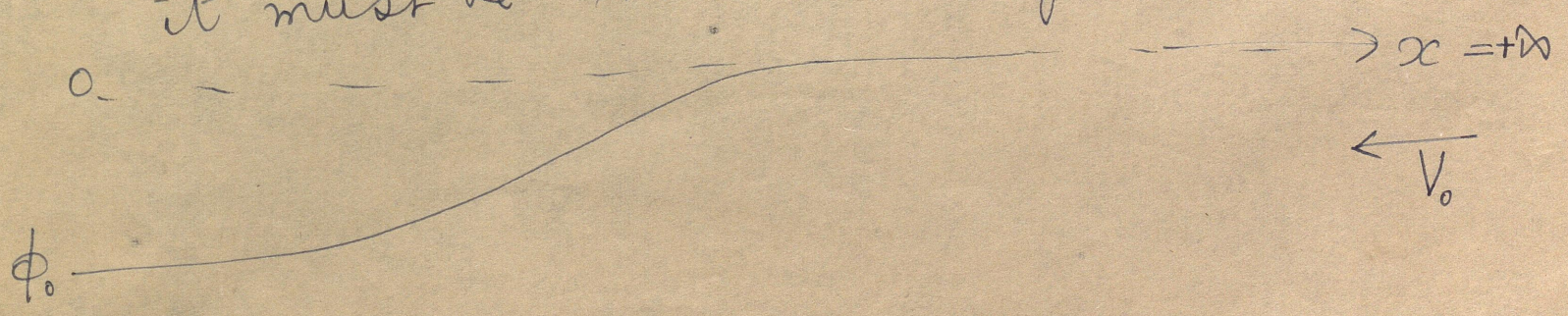
Bombay  
9-7-69.

Dear Dr. Varma,

Sorry you did not like my previous communication. You must have received the I.T. clearance certificate and must be busy getting all packed up and ready. Wish you a smooth and fast pre-travel formalities with GOI. Are you leaving your family back here?

Here is some Plasma Physics for a change. Please see a paper on "Collision-free Shocks" by Prof. D. Montgomery and Glenn Joyce in Journal of Plasma Physics, Feb. '69 (page 1). It seems to me there is a fundamental ~~error~~ mistake in there though the basic physical argument is right (though it is nothing new). I am writing this only as a conversational piece.

Referring the figure for the potential, it must be the other way round, as below,



to be consistent with the assumption that electrons and ions are streaming in from  $x = +\infty$  where their streaming velocity is  $-V_0$ . For electrons to be "trapped", in other words, for them to be reflected at the potential barrier (See paper by BGK, Phys. Rev., 108, 546, 1957) they must meet a decreasing potential. For  $\phi = 0$  at  $x = +\infty$ ,  $\phi$  must therefore be negative at other values of  $x$ .

② for the same reason, the trapped electron distribution must be given by,

$$n_{et}(x) = \int_{-e\phi}^{-e\phi} \frac{d\Sigma f_{et}(\Sigma)}{\sqrt{2m_e(\Sigma + e\phi)}}$$

This will correspondingly alter the later equations here and there, the main change being that there are no "negative energy electrons downstream".

③ Instead of the final trapped particle distribution downstream, one should have trapped particle distribution upstream i.e. at  $x = +\infty$  and  $\psi = 0$ . This

is given by.

$$n_{\text{et}}(x=+\infty) = n_0 \cdot 2(\psi=0) = n_0 \frac{\partial A}{\partial \psi} \Big|_{\psi=0}$$

(4)

$$= n_0 \frac{\partial U}{\partial \psi} \Big|_{\psi=0} = \dots$$

if we once again assume  $A \stackrel{!}{=} U$   
suitable boundary conditions for  $A(\psi)$ .

Can you kindly see which is the  
correct approach and let me know? This  
is a very simple paper and most probably  
you are familiar with such things anyway.

Expecting an early reply,

Yours sincerely,

P. Jayasimha



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P. JAYASIMHA

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BOMBAY 5

Bombay,  
19th June 69

Dear Dr. Verma,

Thank you for your prompt reply. I gather that there is nothing to be gained by coming to PRL. The status quo continued means that my presence would not be tolerated too much there also! Do you know that my presence here is not official at all because my 5-year contract which ended in 1967 or so, has not been renewed. I have therefore decided to ask for a year's leave without pay with liberty to use the TIFR library only. This way I can carry on for the rest of my bond period (with the Ministry of Education). I will be applying outside too but may not get anything. In that case I give up and resign from Physics completely. In any case, please keep me informed about your movements and address and also your impressions of the Drummond group and Plasma Physics in general in USA. Can I quote you to Dr. Vardya - "He said that you could have done what you are doing now in PRL in TIFR itself."?

With regards,

Yours sincerely,

P. Jayasimha.