

Re: JIMO and more?

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From: George Dishman (george_at_briar.demon.co.uk)

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"Aidan Karley" <aidan@mynamplus1.demon.co.uk.invalid> wrote in message news:VA.00000542.17dac65c@mynamplus1.demon.co.uk.invalid...
> *In article <Xns95F25CF0CCB48lkajehorluasldfjknak@151.164.30.42>, John
> Schutkeker wrote:*
>> *I thought that you could get it to work with the ion drive alone, since
>> there's no atmospheric friction. Without friction, there's no lower
>> limit
>> on thrust,
>>
> These points are (probably) correct ...
>
>> so it's possible with an electric engine.
>>
> But this is not a valid deduction from the premises.
>
> In theory I suppose that a sufficiently strong ion drive would be
> able
> to able to produce a noticeable drive from electrons alone, but there are
> two
> objections (one fundamental, one differently fundamental)
>
> 1] In any impulse engine (rocket, ion drive, jet), the engine and thus
> the
> driven machine acquire forward momentum as particles of mass M are given
> momentum Mv in a backwards direction (momentum is a vector); but electrons
> are 1/1800 of the mass of a hydrogen atom. So at first glance, an electron
> would provide 1/1800 of the momentum drive of an otherwise similar
> positive
> ion drive;
> 2] if you constructed a negative-only ion drive, then your spacecraft
> would
> acquire a net positive charge while space behind it would acquire a net
> negative charge. Dissimilar charges attract, and you'll find that the
> overall
> sum of the resulting forces is zero.*

What that means though is that if electrons are emitted

in a tight beam at high speed, the craft would acquire a positive charge. This would deflect protons away slightly and gather in free electrons from the environment until dynamic equilibrium was reached. That balancing flow should be nearly omni-directional other than the preferential flow due to the solar wind (something that would be present anyway) so the engine should still produce thrust.

Your first point is of course valid and means that for a given thrust, the particle speed needs to be higher hence more kinetic energy is used. However, since solar power is free, wouldn't the absence of a need for reaction mass still be attractive for long missions.

George