Refutation of control by quantum observation

From: Biele, R; Rodríguez-Rosario, CA; Frauenheim, T; Rubio, A. 2016. Controlling heat and particle currents in nanodevices by quantum observation. arxiv.org/ftp/arxiv/papers/1611/1611.08471.pdf. Emails: (robert.biele@gmx.net), (crodrig@mpsd.mpg.de), and (angel.rubio@mpsd.mpg.de).

"*A quantum observer has zero entropy flow.* Examining the entropy flow due to the local observation shows that the quantum observer does not add a new entropy flow to the system in contrast to a standard thermodynamic heat bath. Inserting [Eq. (10)] into Eq. (9) shows that the entropy flux due to the quantum observer is zero. This means that a quantum observer changes the energy flow in the system directly, without having an entropy flow connected with it."

We assume the apparatus and method of Meth8/VŁ4, where T is the designated proof value. (Other values are F for contradiction, C for falsity, and N for truth; 16-valued truth tables are row-major.)

```
LET:  p q r s        p;  |k>;  Tr;  vD^2;
      1 2 0          (%p>#p);  (%p<#p);  (%p>#p)-(%p>#p)
      lc_sigmaD      |k><k|
      ln(p)          0<p<1
```

```
 LDp = ~(vD^2)[2|k><k|p|k><k| - |k><k|p - p|k><k|]                                    (10.1)

LDp = s&(((%p<#p)&(((q&~q)&p)&(q&~q))) - (((q&~q)&p) – (p&(q&~q))))                   (10.2)

0=-Tr[LDp(ln (lc_sigmaD))                                                            (9.1)

((%p>#p)-(%p>#p)) = (~r&((LDp)&(((p&~q)<(%q>#q))&((q&~q)>((%p>#p)-(%p>#p))))))
                                                                                     (9.2)

Eq. 10.1 is substituted into Eq. 9.1:                                                (11.1)

((%p>#p)-(%p>#p)) = (~r&((s&(((%p<#p)&(((q&~q)&p)&(q&~q))) - (((q&~q)&p) -
      (p&(q&~q)))))&(((q&~q)<(%q>#q))&((q&~q)>((%q>#q)-(%q>#q))))) ;
                                                          NNNN NNNN NNNN NNNN        (11.2)
```

Eq. 11.2 as rendered is *not* tautologous. This means that control by quantum observation is refuted.