



DEPARTMENT OF ASTRONOMY

UNIVERSITY OF CAPE TOWN  
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## Irrotational-fluid cosmologies in fourth-order gravity

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**Abstract content**   
 (Max 300 words)   
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We explore classes of irrotational-fluid cosmological models in the context of  $f(R)$ -gravity in an attempt to put some theoretical and mathematical restrictions on the form of the  $f(R)$ -gravitational Lagrangian. In particular, we investigate the consistency of linearised dust models for shear-free cases as well as in the limiting cases when either the gravito-magnetic or gravito-electric components of the Weyl tensor vanish. We also discuss the existence and consistency of classes of non-expanding irrotational spacetimes in  $f(R)$ -gravity.

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