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POS-H78 – Revisiting the Unruh effect with modified dispersion relations

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The detected spectrum in the Unruh effect is Planckian for massless fields. The reason is that the latter display a linear dispersion relation. It is also well known that for massive fields, the detected spectrum in the Unruh effect would lose its Planckian profile. Remarkably, the relativistic Doppler shift approach to the Unruh effect shows that, just like with massive fields, fields with nonlinear dispersion relations also lead to a departure from a Planckian spectrum. The approach even applies to the case of modified Lorentz transformations. The big advantage of the approach, however, lies in the fact that it offers a very intuitive explanation for the reasons behind such results, and applies even to analogs of the Unruh effect. Detecting such a departure from thermality using water surface waves is very promising.

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