Gravitational Wave Propagation & Shock formation in Modified gravity theory

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**Modified gravity** = Einstein’s General Relativity + Correction
- Predicted by fundamental theories
- Tested experimentally (Table-top, astrophysical obs., ...)

**Modifications to gravity** → Modifications to Gravitational Wave
- GR : Gravitational wave propagates at the light speed
- Mod. grav.: Faster/slower propagation than the light speed?

✓ GW may propagate faster than the light → Any pathologies?
✓ Shock formation due to non-constant propagation speed?
Shock formation due to non-constant propagation speed?

Ex.) Burgers’ equation

\[ \partial_t u + u \partial_x u = 0 \]

- Wave propagation speed \( \neq \) const.
- Waveform distortion \( \rightarrow \) Shock formation

Does it occur for gravitational wave in modified gravity?