Proof. Take $\mathbb{R}_+ = \left\{ \frac{x\in\mathbb{R}}{x>0} \right\}$, $\mathcal{A} = \Delta$, $T = \left\{ \frac{\uparrow\{x\}}{x\in\mathbb{R}_+} \right\}$ where $\uparrow = \uparrow^{\mathbb{R}}$.
$\bigsqcup T = \uparrow \mathbb{R}_+$; $\mathcal{A} \times^{\mathsf{RLD}} \bigsqcup T = \Delta \times^{\mathsf{RLD}} \uparrow \mathbb{R}_+$.
$\bigsqcup\left\{ \frac{\mathcal{A}\times^{\mathsf{RLD}}\mathcal{B}}{\mathcal{B}\in T} \right\} = \bigsqcup\left\{ \frac{\Delta\times^{\mathsf{RLD}}\uparrow\{x\}}{x\in\mathbb{R}_+} \right\}$.
We'll prove that $\bigsqcup\left\{ \frac{\Delta\times^{\mathsf{RLD}}\uparrow\{x\}}{x\in\mathbb{R}_+} \right\} \neq \Delta\times^{\mathsf{RLD}} \uparrow \mathbb{R}_+$.
Consider $K = \bigcup\left\{ \frac{\{x\}\times(-1/x;1/x)}{x\in\mathbb{R}_+} \right\}$.
$K \in \mathrm{GR}(\Delta\times^{\mathsf{RLD}} \uparrow \{x\})$ and thus $K \in \mathrm{GR}\bigsqcup\left\{ \frac{\Delta\times^{\mathsf{RLD}}\uparrow\{x\}}{x\in\mathbb{R}_+} \right\}$. But $K \notin \mathrm{GR}(\Delta\times^{\mathsf{RLD}} \uparrow \mathbb{R}_+)$. □

Theorem 1029. For a filter a we have $a \times^{\mathsf{RLD}} a \sqsubseteq \mathrm{id}^{\mathsf{RLD}(\mathrm{Base}(a))}$ only in the case if $a = \bot^{\mathfrak{F}(\mathrm{Base}(a))}$ or a is a trivial ultrafilter.

Proof. If $a \times^{\mathsf{RLD}} a \sqsubseteq \mathrm{id}^{\mathsf{RLD}(\mathrm{Base}(a))}$ then there exists $m \in \mathrm{GR}(a \times^{\mathsf{RLD}} a)$ such that $m \subseteq \mathrm{id}_{\mathrm{Base}(a)}$. Consequently there exist $A, B \in \mathrm{GR}\, a$ such that $A \times B \subseteq \mathrm{id}_{\mathrm{Base}(a)}$ what is possible only in the case when $\uparrow^{\mathrm{Base}(a)} A = \uparrow^{\mathrm{Base}(a)} B = a$ is trivial a ultrafilter or the least filter. □

Corollary 1030. Reloidal product of a non-trivial atomic filter with itself is non-atomic.

Proof. Obviously $(a \times^{\mathsf{RLD}} a) \sqcap \mathrm{id}^{\mathsf{RLD}(\mathrm{Base}(a))} \neq \bot^{\mathfrak{F}(\mathrm{Base}(a))}$ and $(a \times^{\mathsf{RLD}} a) \sqcap \mathrm{id}^{\mathsf{RLD}(\mathrm{Base}(a))} \sqsubset a \times^{\mathsf{RLD}} a$. □

Example 1031. There exist two atomic reloids whose composition is non-atomic and non-empty.

Proof. Let a be a non-trivial ultrafilter on $\mathbb{N}$ and $x \in \mathbb{N}$. Then

$$(a\times^{\mathsf{RLD}} \uparrow^{\mathbb{N}} \{x\}) \circ (\uparrow^{\mathbb{N}} \{x\} \times^{\mathsf{RLD}} a) = \bigsqcap\left\{ \frac{\uparrow^{\mathsf{RLD}(\mathbb{N};\mathbb{N})} ((A \times \{x\}) \circ (\{x\} \times A))}{A \in a} \right\} = \bigsqcap\left\{ \frac{\uparrow^{\mathsf{RLD}(\mathbb{N};\mathbb{N})} (A \times A)}{A \in a} \right\} = a \times^{\mathsf{RLD}} a$$

is non-atomic despite of $a\times^{\mathsf{RLD}} \uparrow^{\mathbb{N}} \{x\}$ and $\uparrow^{\mathbb{N}} \{x\} \times^{\mathsf{RLD}} a$ are atomic. □

Example 1032. There exists non-monovalued atomic reloid.

Proof. From the previous example it follows that the atomic reloid $\uparrow^{\mathbb{N}} \{x\} \times^{\mathsf{RLD}} a$ is not monovalued. □

Example 1033. Non-convex reloids exist.

Proof. Let a be a non-trivial ultrafilter. Then $\mathrm{id}^{\mathsf{RLD}}_a$ is non-convex. This follows from the fact that only reloidal products which are below $\mathrm{id}^{\mathsf{RLD}(\mathrm{Base}(a))}$ are reloidal products of ultrafilters and $\mathrm{id}^{\mathsf{RLD}}_a$ is not their join. □

Example 1034. $(\mathsf{RLD})_{\mathrm{in}} f \neq (\mathsf{RLD})_{\mathrm{out}} f$ for a funcoid f.

Proof. Let $f = \mathrm{id}^{\mathsf{FCD}(\mathbb{N})}$. Then $(\mathsf{RLD})_{\mathrm{in}} f = \bigsqcup\left\{ \frac{a\times^{\mathsf{RLD}} a}{a\in\mathrm{atoms}^{\mathfrak{F}(\mathbb{N})}} \right\}$ and $(\mathsf{RLD})_{\mathrm{out}} f = \mathrm{id}^{\mathsf{RLD}(\mathbb{N})}$. But we have shown above $a \times^{\mathsf{RLD}} a \not\sqsubseteq \mathrm{id}^{\mathsf{RLD}(\mathbb{N})}$ for non-trivial ultrafilter a, and so $(\mathsf{RLD})_{\mathrm{in}} f \not\sqsubseteq (\mathsf{RLD})_{\mathrm{out}} f$. □

Proposition 1035. $\mathrm{id}^{\mathsf{FCD}(\mathfrak{U})} \sqcap \uparrow^{\mathsf{FCD}(\mathfrak{U};\mathfrak{U})} ((\mathfrak{U} \times \mathfrak{U}) \setminus \mathrm{id}_{\mathfrak{U}}) = \mathrm{id}^{\mathsf{FCD}}_{\Omega(\mathfrak{U})} \neq \bot^{\mathsf{FCD}(\mathfrak{U};\mathfrak{U})}$ for every infinite set $\mathfrak{U}$.