



# Eksperimen Verifikasi Hukum Kekekalan Momentum dengan VBL

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# Tujuan:

- Diberikan perangkat lunak video analisis dan video tumbukan elastik dan tidak elastik mahasiswa dapat melakukan eksperimen Verifikasi hukum Kekekalan Momentum

# Teori

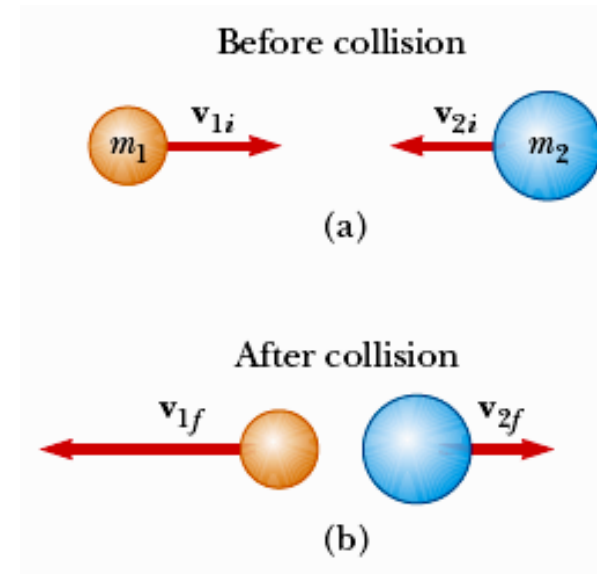
## Conservation of Linear Momentum

$$\mathbf{p}_{1i} + \mathbf{p}_{2i} = \mathbf{p}_{1f} + \mathbf{p}_{2f}$$

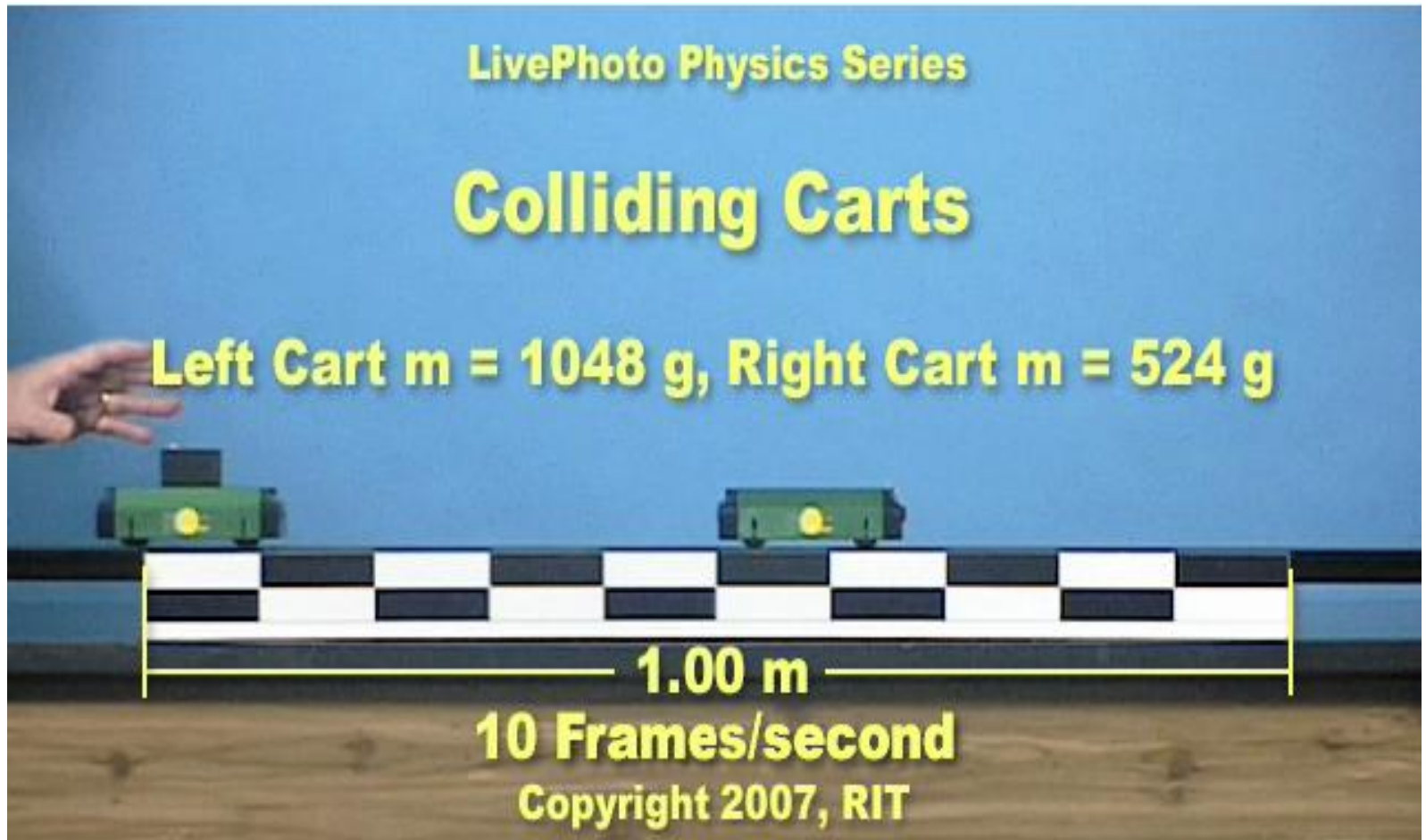
## Elastic Collisions

$$m_1 v_{1i} + m_2 v_{2i} = m_1 v_{1f} + m_2 v_{2f}$$

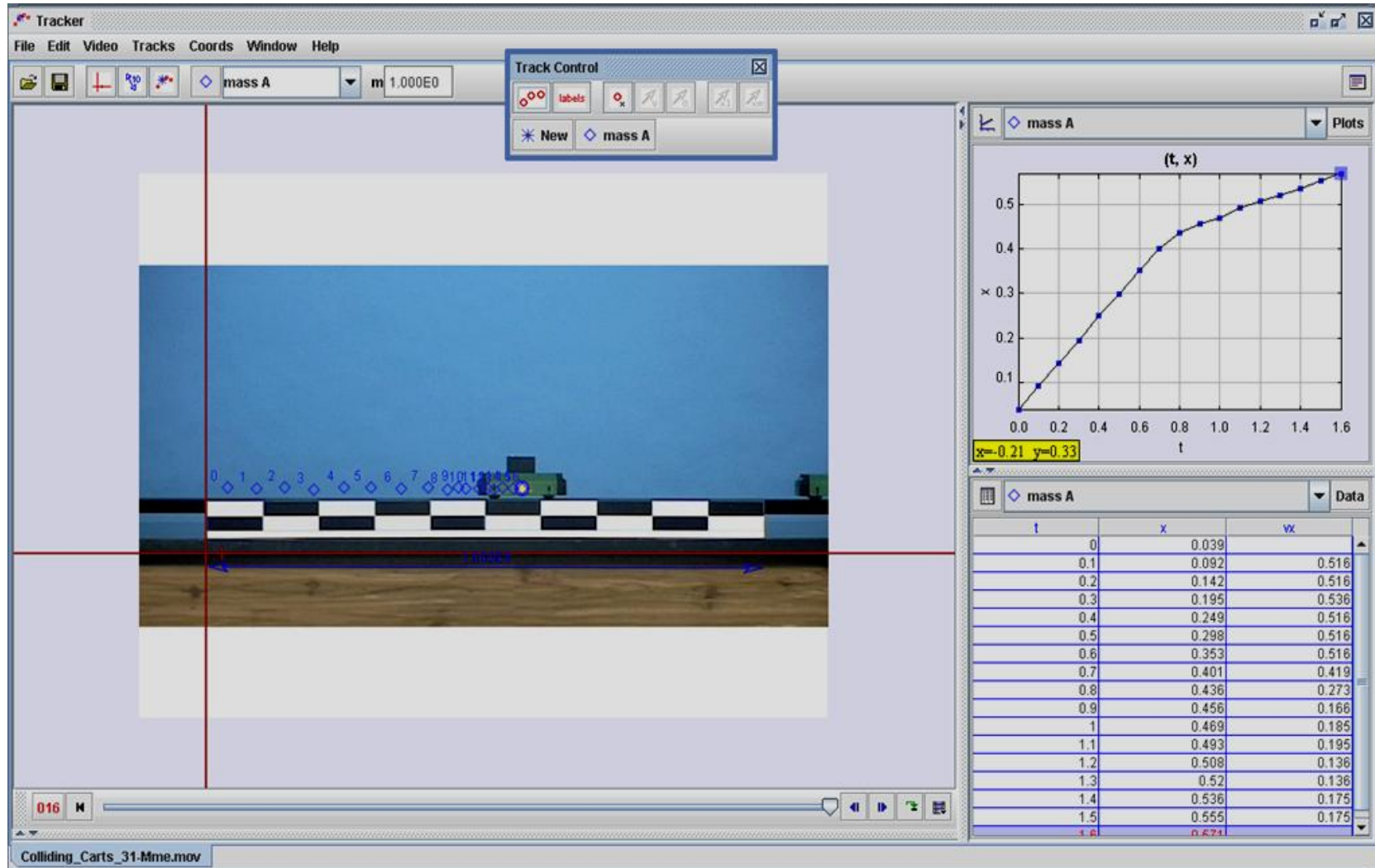
$$\frac{1}{2} m_1 v_{1i}^2 + \frac{1}{2} m_2 v_{2i}^2 = \frac{1}{2} m_1 v_{1f}^2 + \frac{1}{2} m_2 v_{2f}^2$$



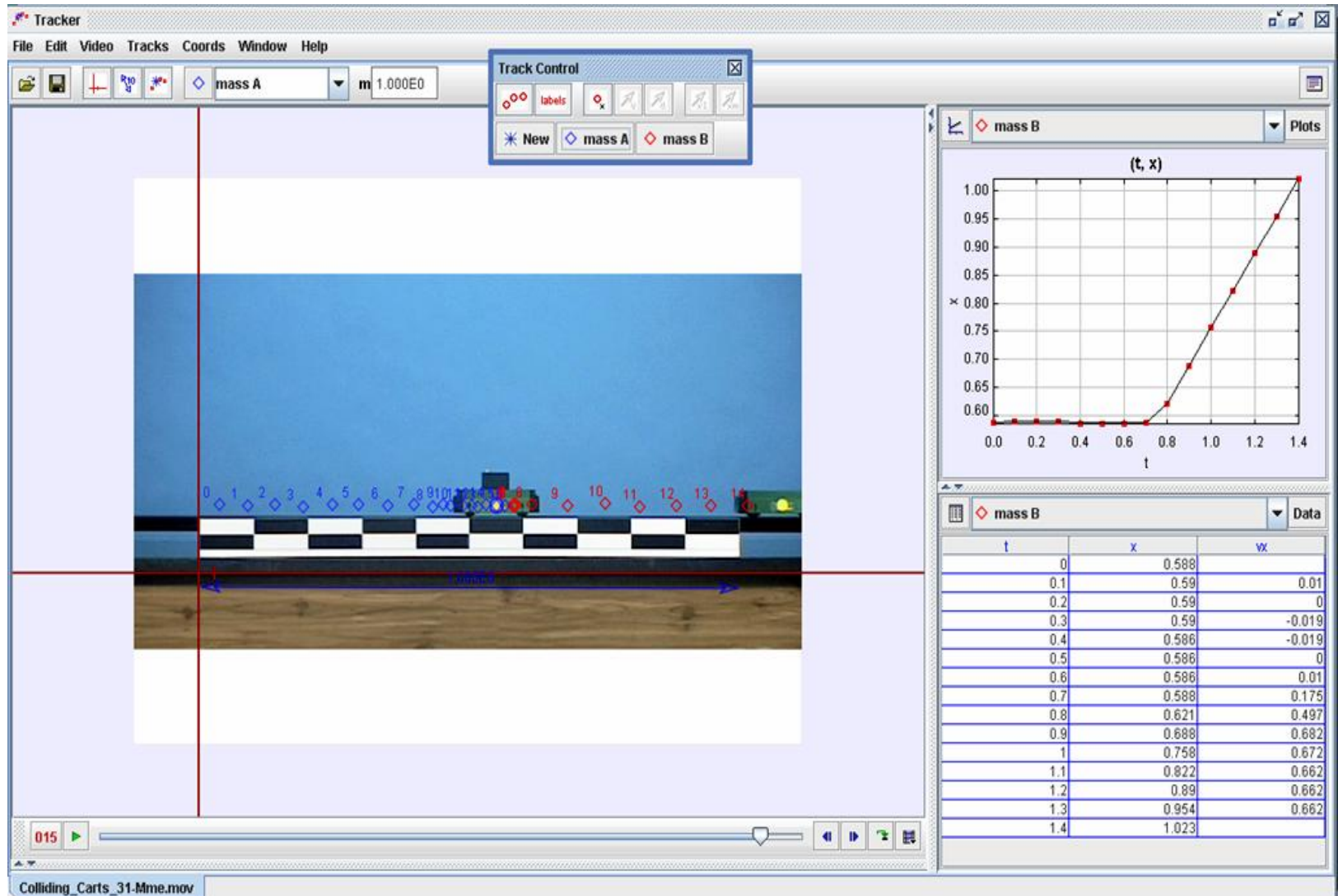
# Video Tumbukan Satu Dimensi



# Eksperimen : Pengambilan Data



# Experimen : Pengambilan Data



# Analisis Data

	A	B	C	D	E	F	G	H	I
1	Massa A =		1.048	kg		Massa B =		0.524	kg
2	No	t (s)	x (m)	vx (m/s)		No	t (s)	x (m)	vx (m/s)
3	1	0	0.03895462			1	0	0.588214766	
4	2	0.1	0.09154336	0.51614872		2	0.1	0.590162497	0.009738655
5	3	0.2	0.14218436	0.51614872		3	0.2	0.590162497	0
6	4	0.3	0.1947731	0.53562603		4	0.3	0.590162497	-0.01947731
7	5	0.4	0.24930957	0.51614872		5	0.4	0.586267035	-0.01947731
8	6	0.5	0.29800284	0.51614872		6	0.5	0.586267035	0
9	7	0.6	0.35253931	0.51614872		7	0.6	0.586267035	0.009738655
10	8	0.7	0.40123259	0.41876217		8	0.7	0.588214766	0.175295791
11	9	0.8	0.43629175	0.27268234		9	0.8	0.621326193	0.496671408
12	10	0.9	0.45576906	0.16555714		10	0.9	0.687549047	0.681705854
13	11	1	0.46940317	0.18503445		11	1	0.757667364	0.671967199
14	12	1.1	0.49277595	0.1947731		12	1.1	0.821942487	0.662228544
15	13	1.2	0.50835779	0.13634117		13	1.2	0.890113073	0.662228544
16	14	1.3	0.52004418	0.13634117		14	1.3	0.954388196	0.662228544
17	15	1.4	0.53562603	0.17529579		15	1.4	1.022558781	
18	16	1.5	0.55510334	0.17529579					
19	17	1.6	0.57068519						

$$v_{ai} = 0.519 \pm 0.008 \text{ m/s}$$

$$v_{af} = 0.167 \pm 0.023 \text{ m/s}$$

$$p_{ai} = 0.544 \text{ kg.m/s}$$

$$p_{af} = 0.175 \text{ kg.m/s}$$

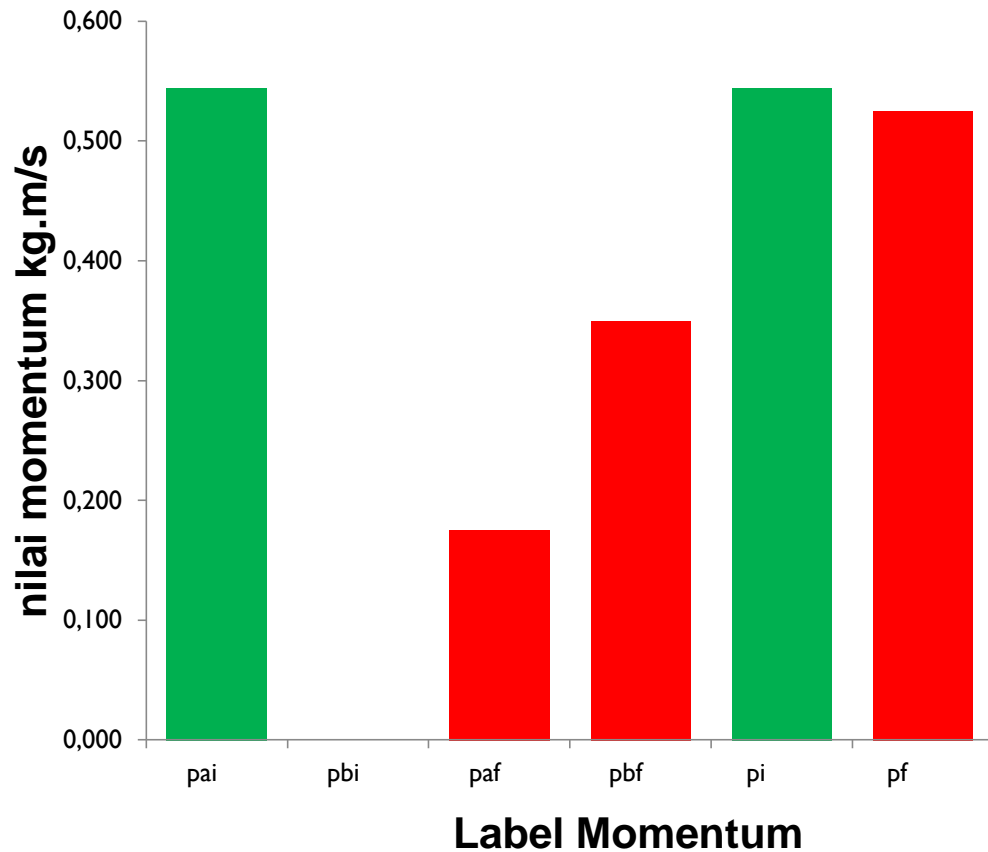
$$v_{bi} = 0 \pm 0 \text{ m/s}$$

$$v_{bf} = 0.668 \pm 0.009 \text{ m/s}$$

$$p_{bi} = 0 \text{ kg.m/s}$$

$$p_{bf} = 0.350 \text{ kg.m/s}$$

# Hasil dan Kesimpulan



pi =	0.5443	kg.m/s
pf =	0.5250	kg.m/s
ralat	0.0193	kg.m/s
% ralat	3.5446	%

Hasil eksperimen menunjukkan kesesuaian yang baik dengan hasil kajian teoretik, dengan ralat 3,5 %