



NLP Research Topics

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Postdoctoral Research Fellow, CSE

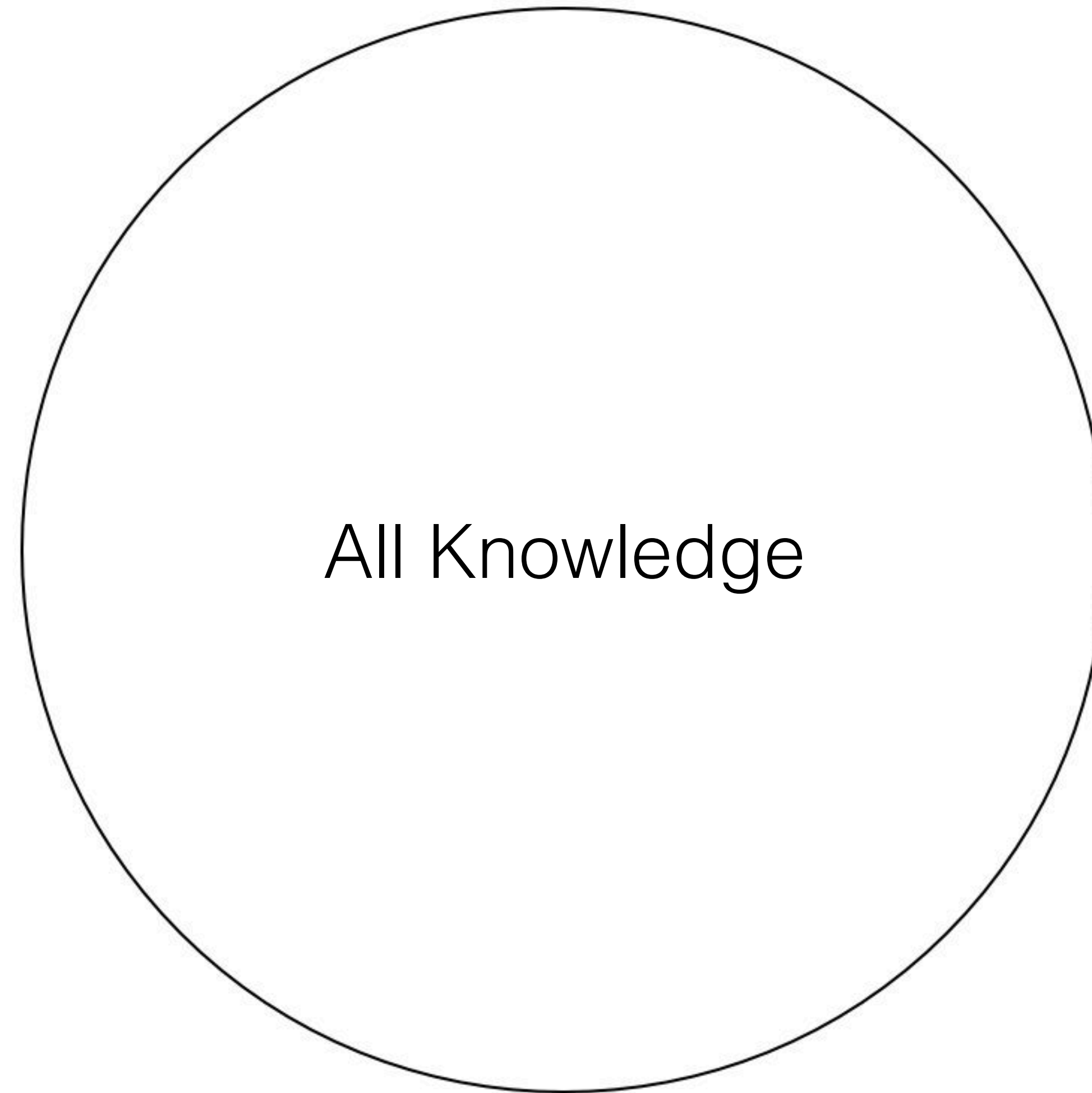
Part 1:
What is Research?

Research and knowledge

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Recent Research

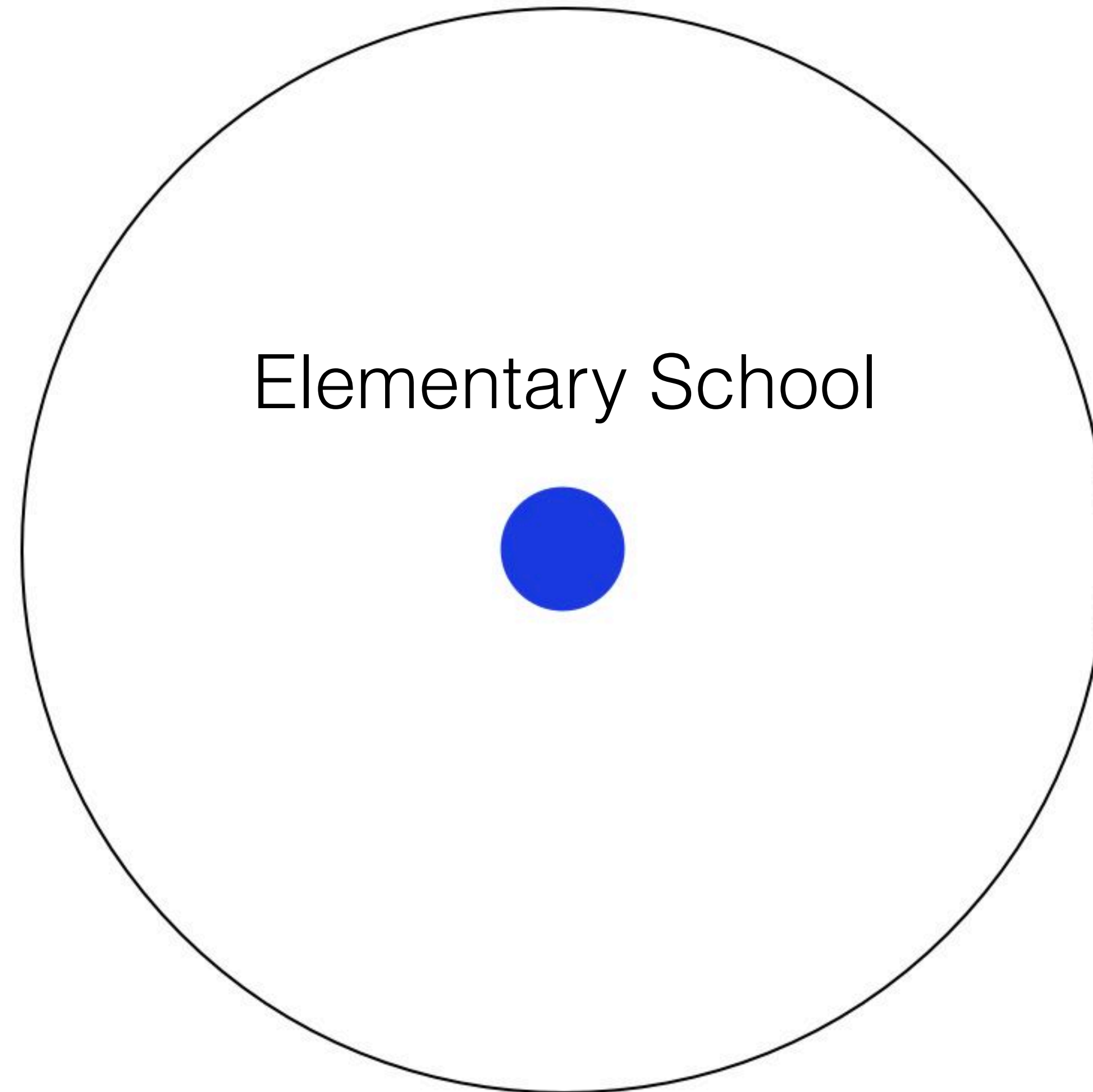
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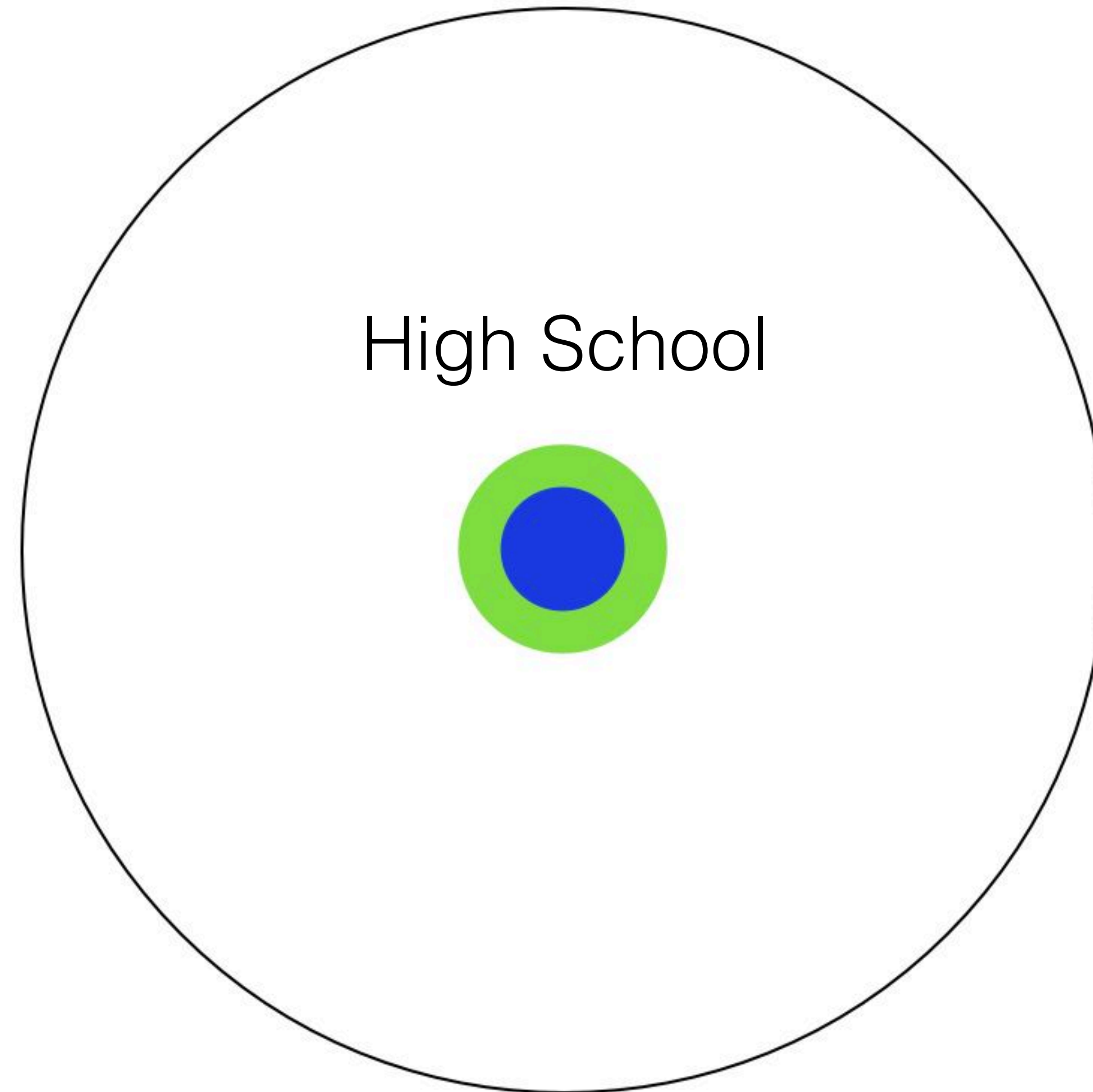
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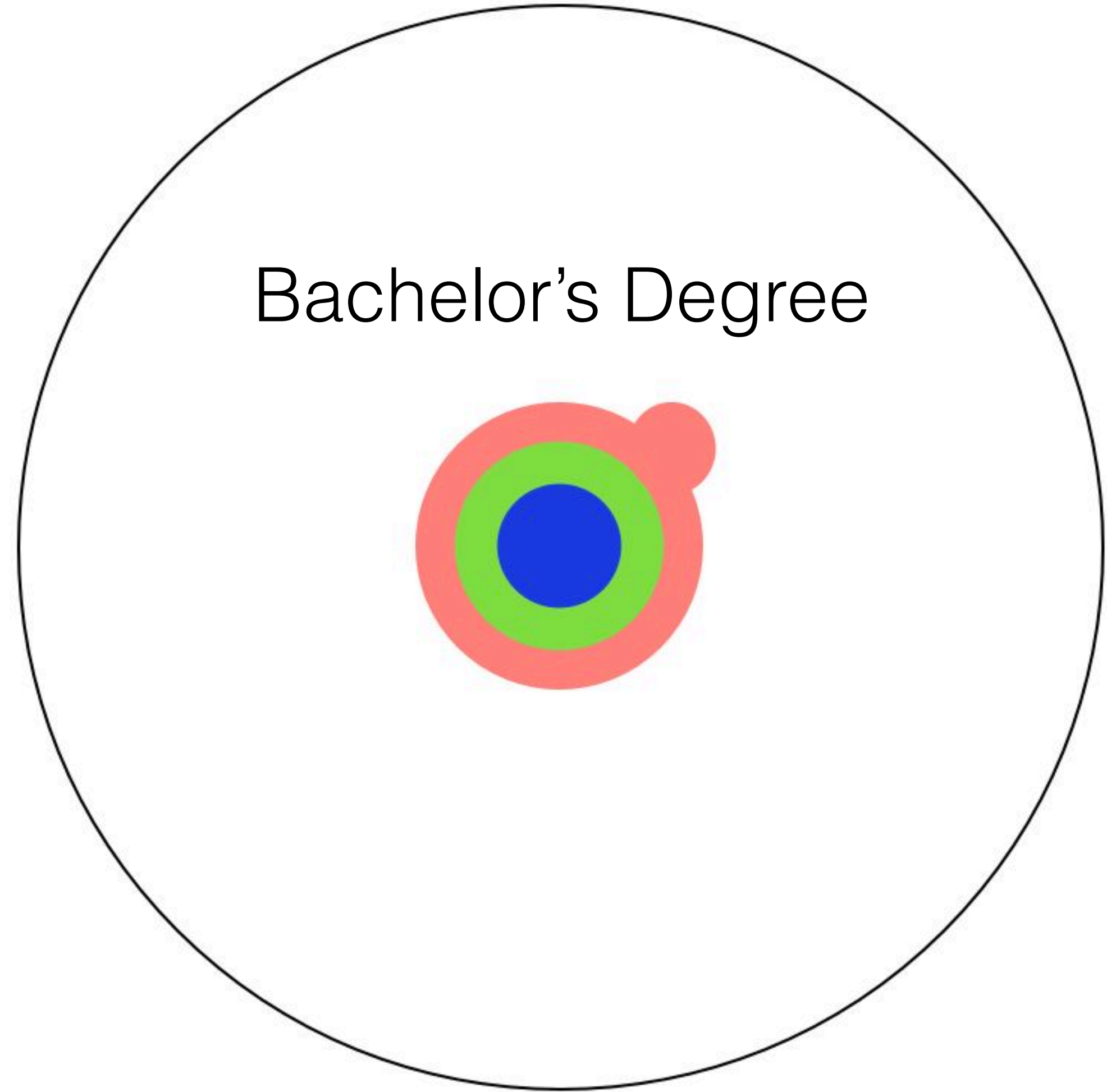
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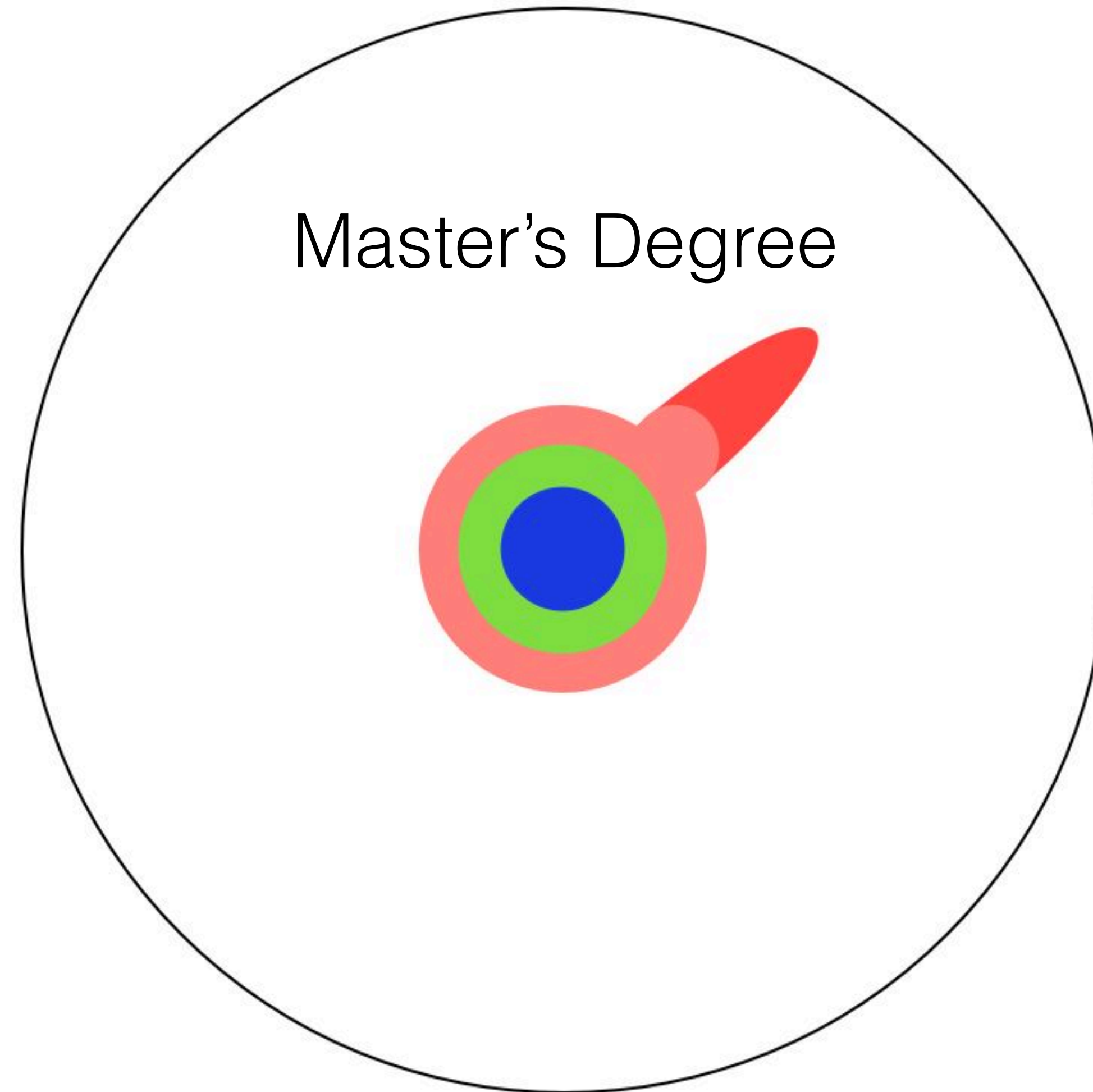
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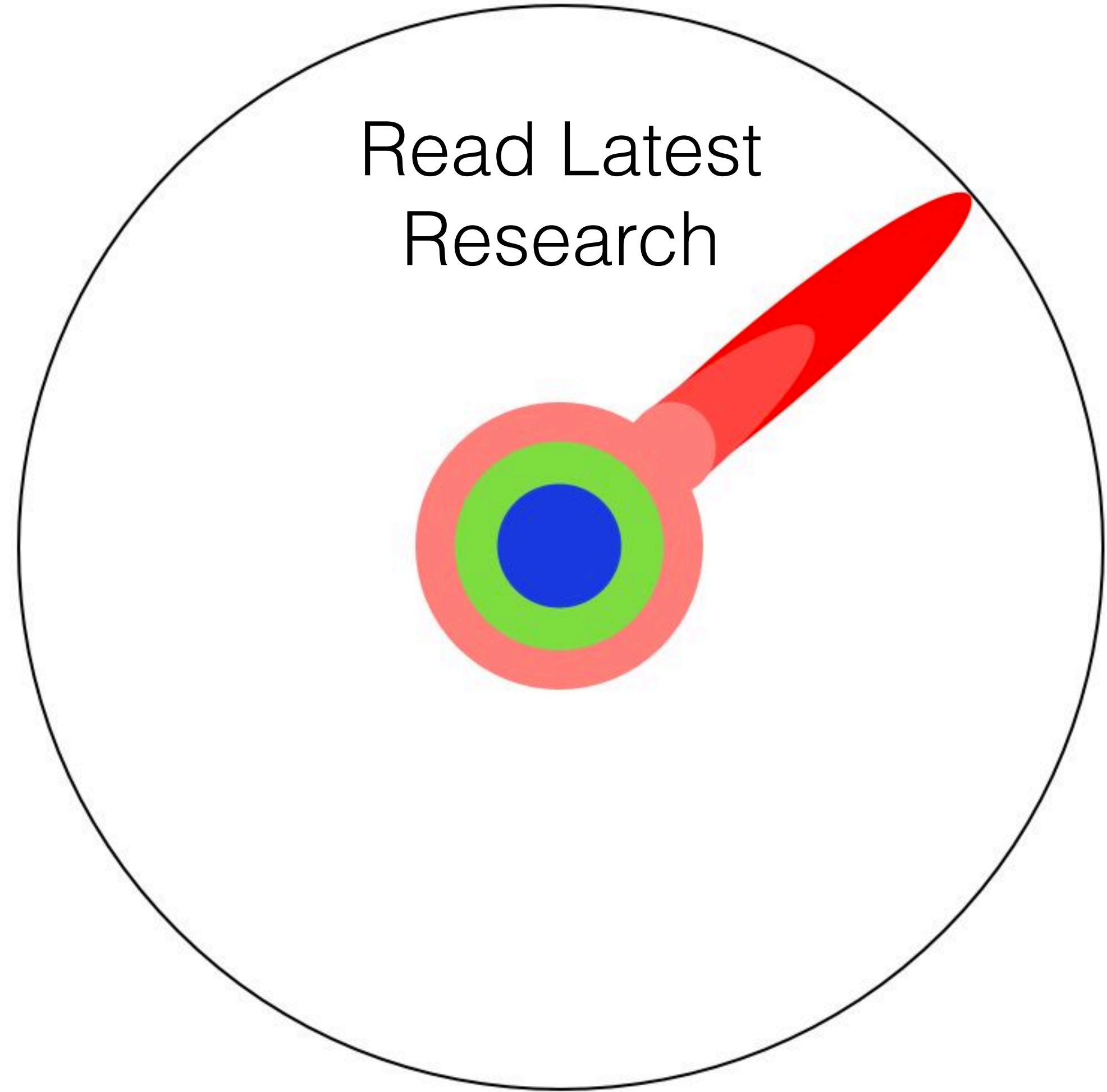
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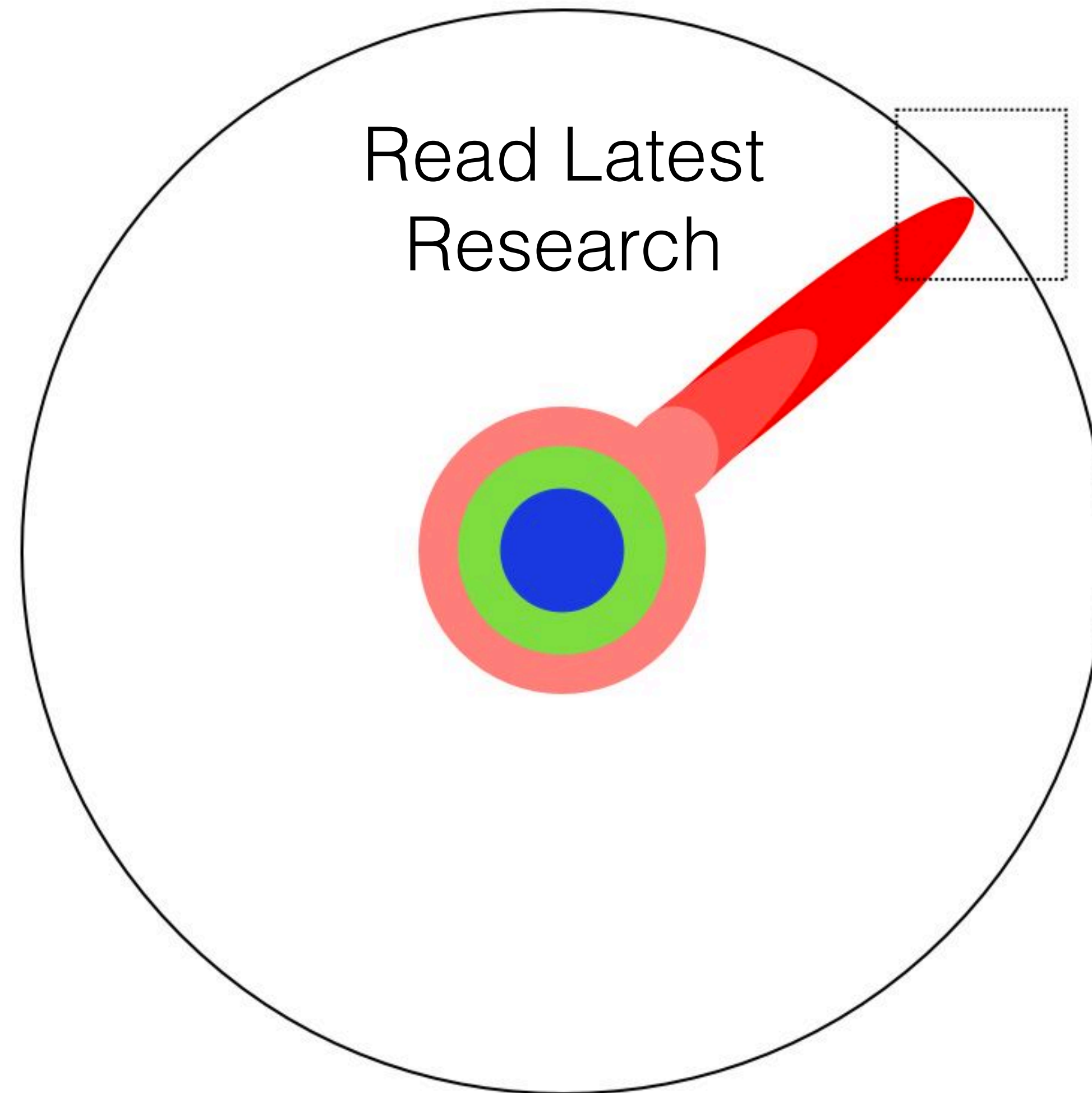
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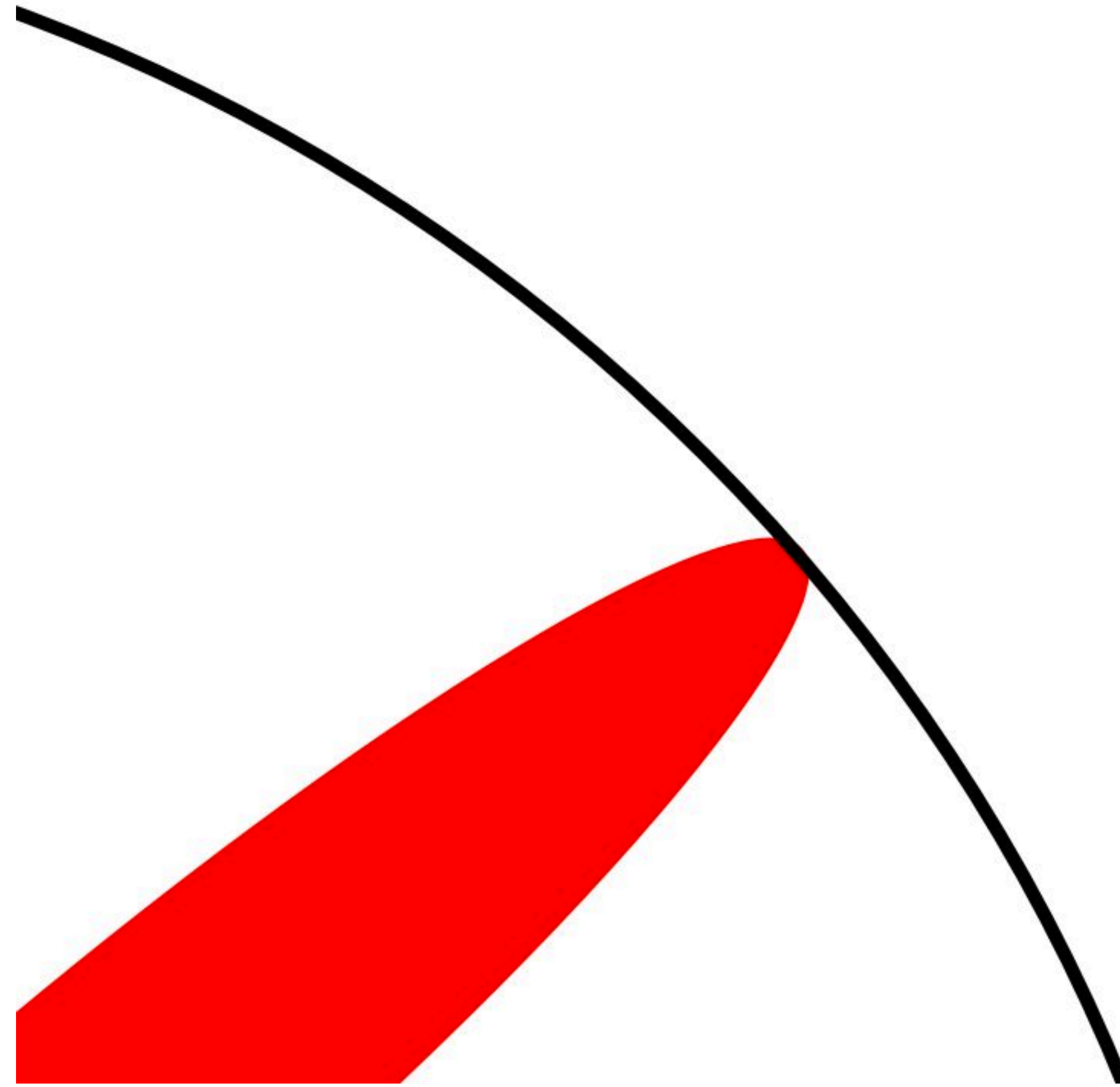
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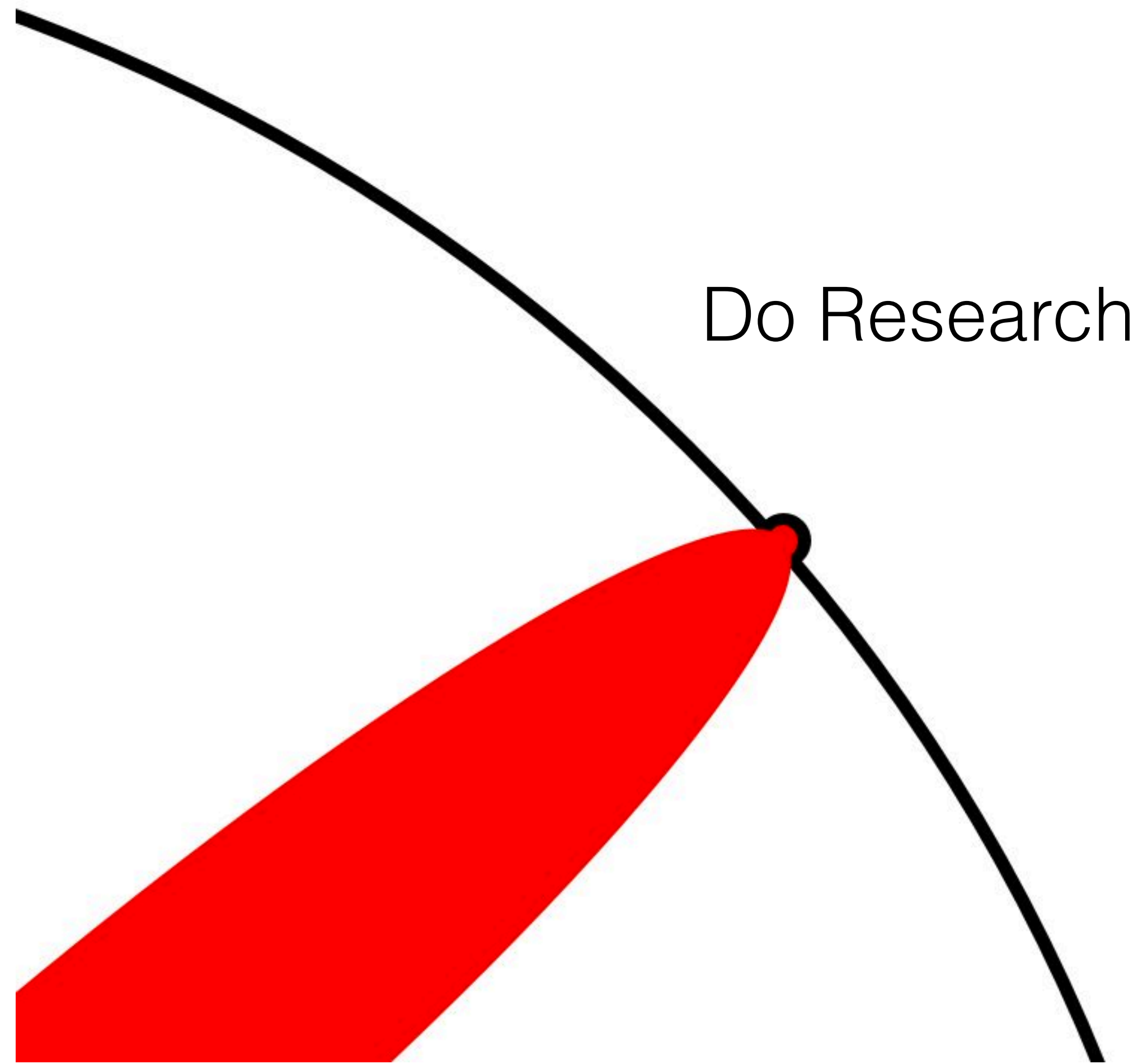
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What does the dictionary say?

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Investigation or experimentation aimed at:

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Investigation or experimentation aimed at:

- The discovery and interpretation of facts,

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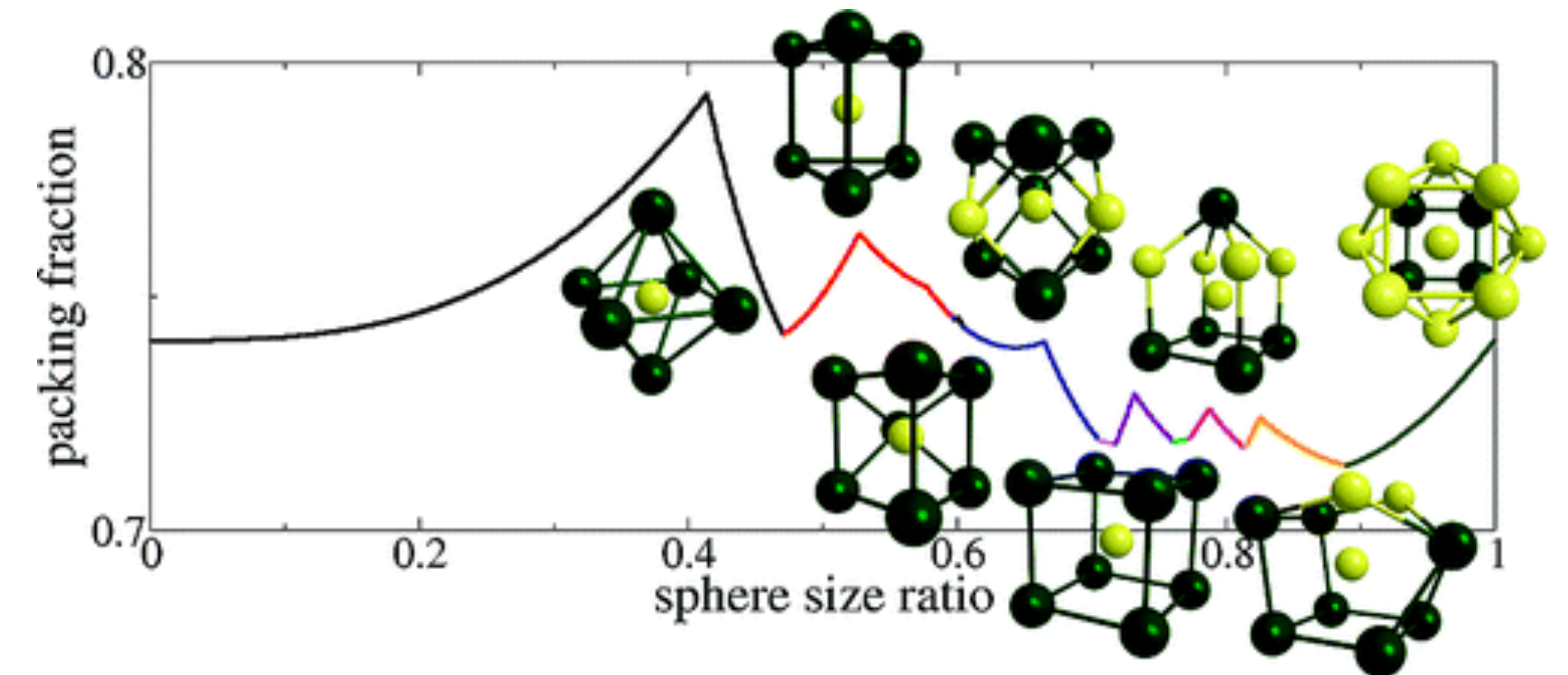
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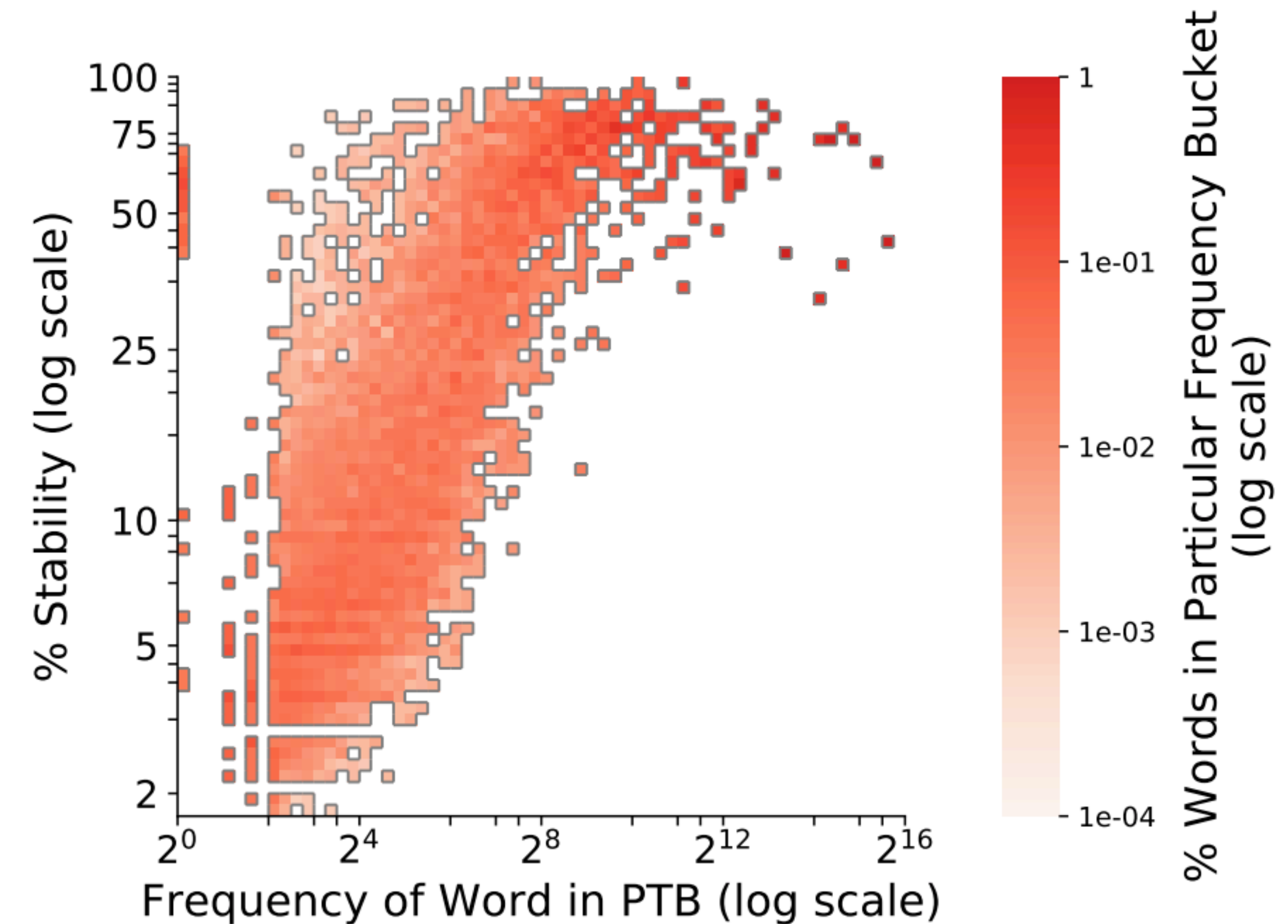
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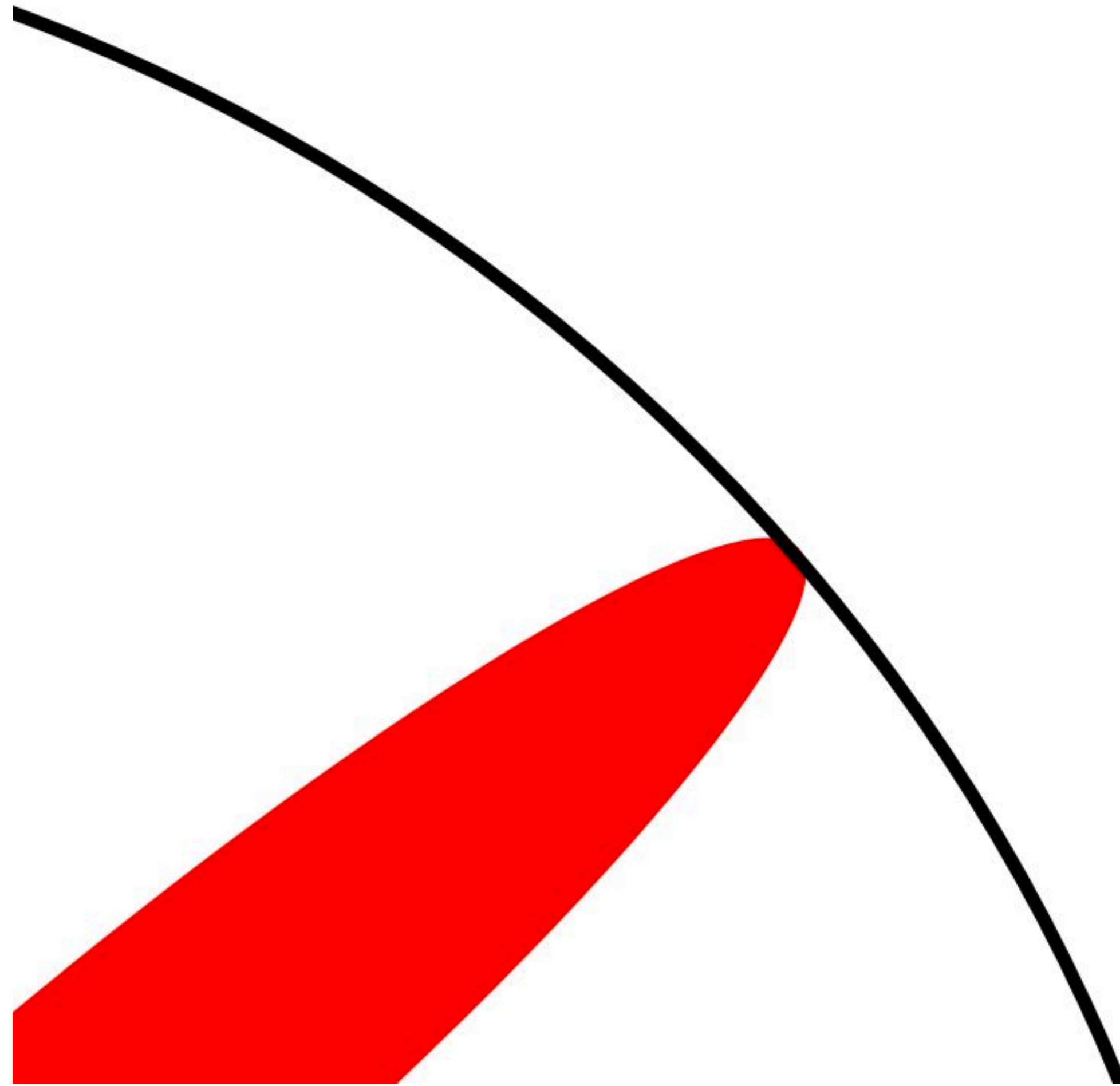
TITLE: [buy] Backconnect bot
BODY: Looking for a solid backconnect bot .
If you know of anyone who codes them please let me know

“Standing on the Shoulders of Giants” — Isaac Newton

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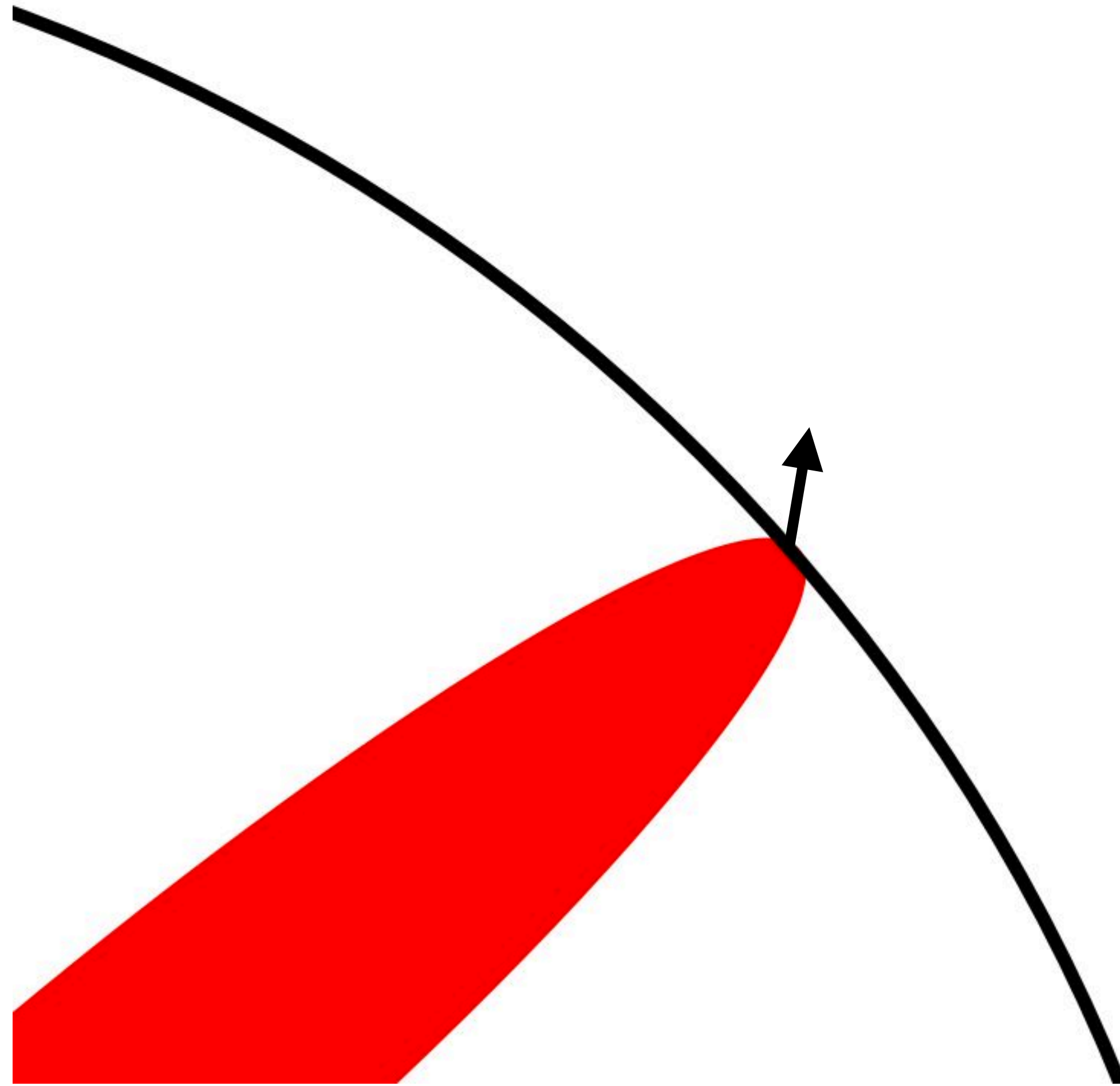
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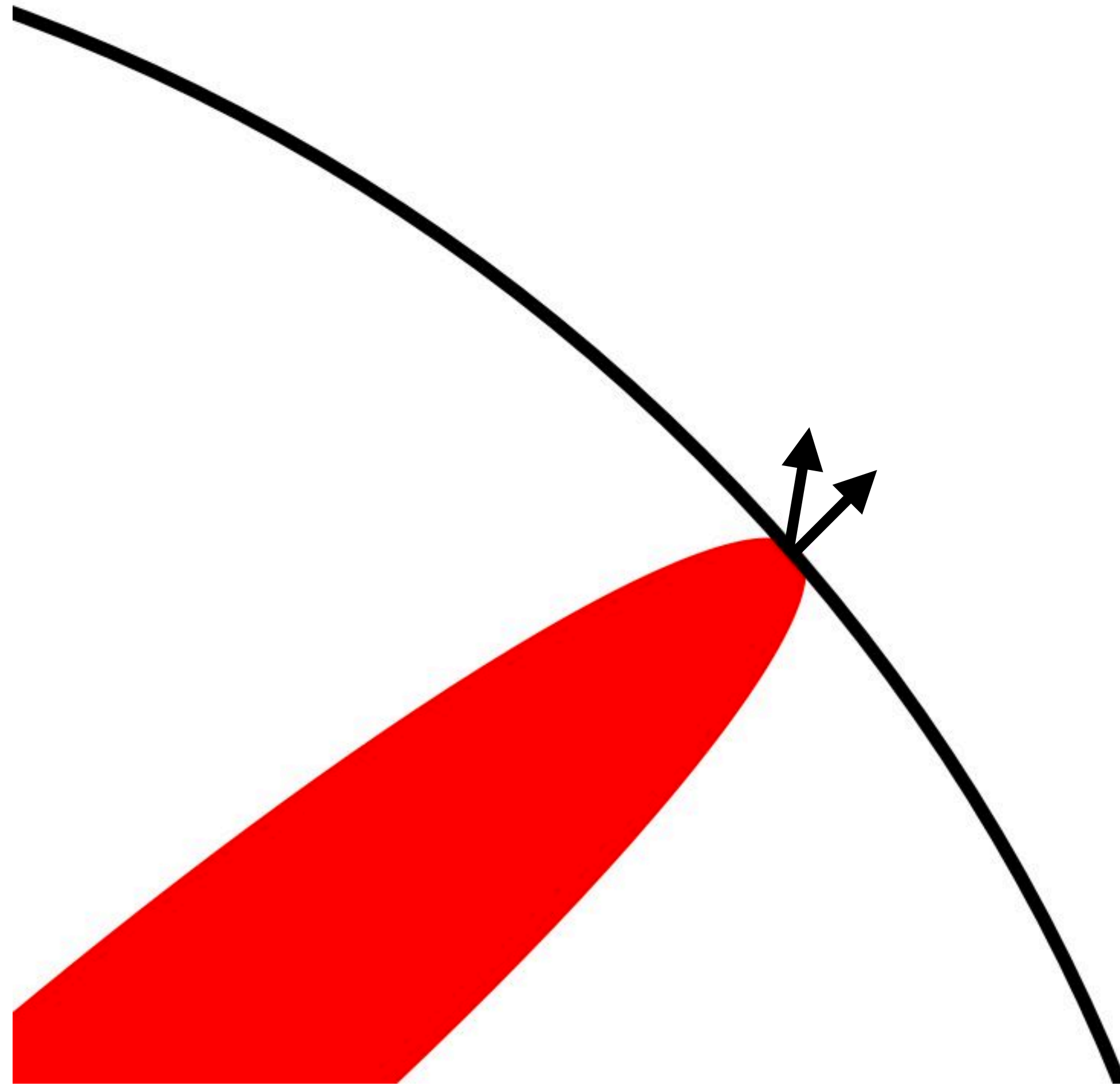
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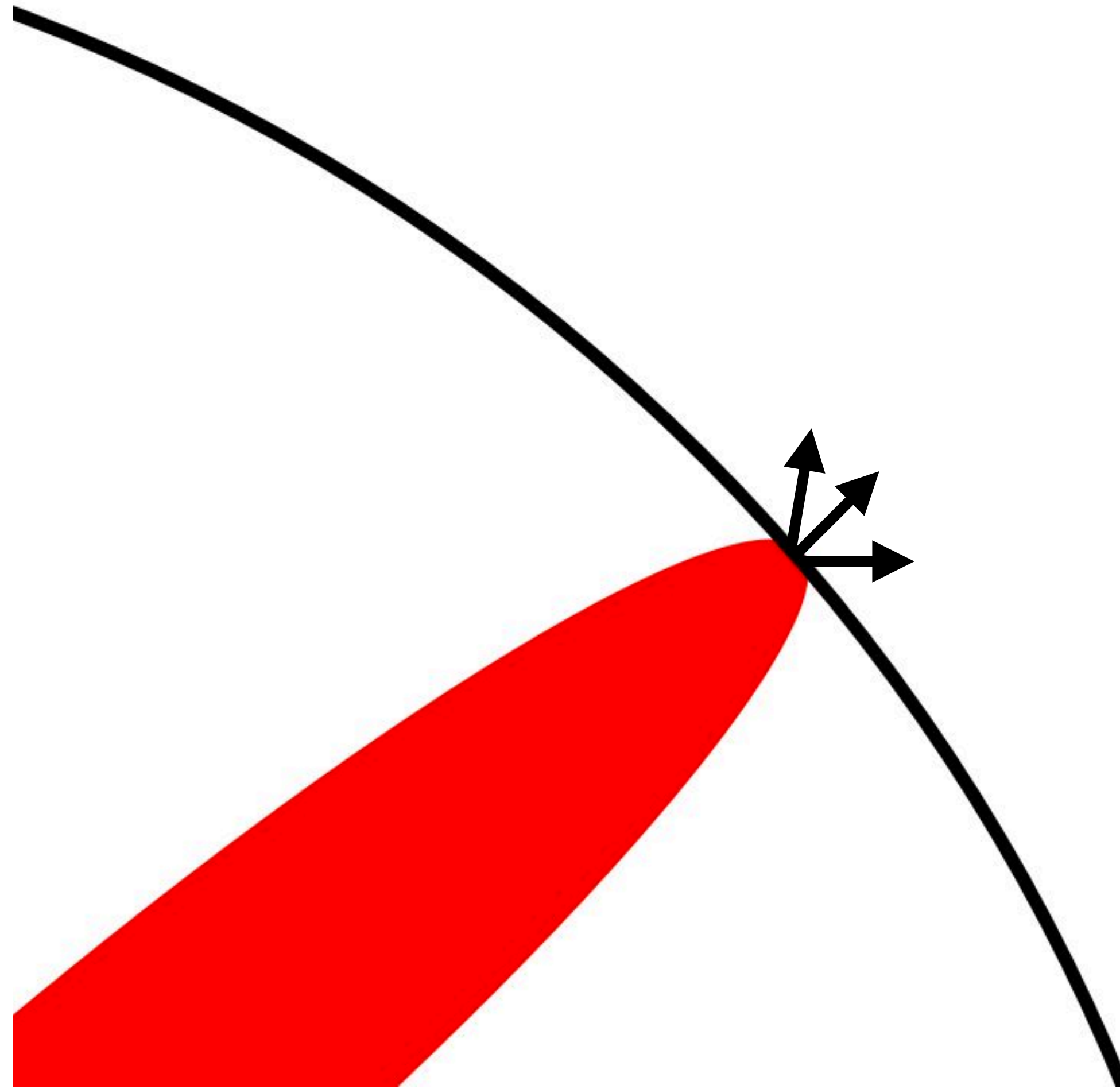
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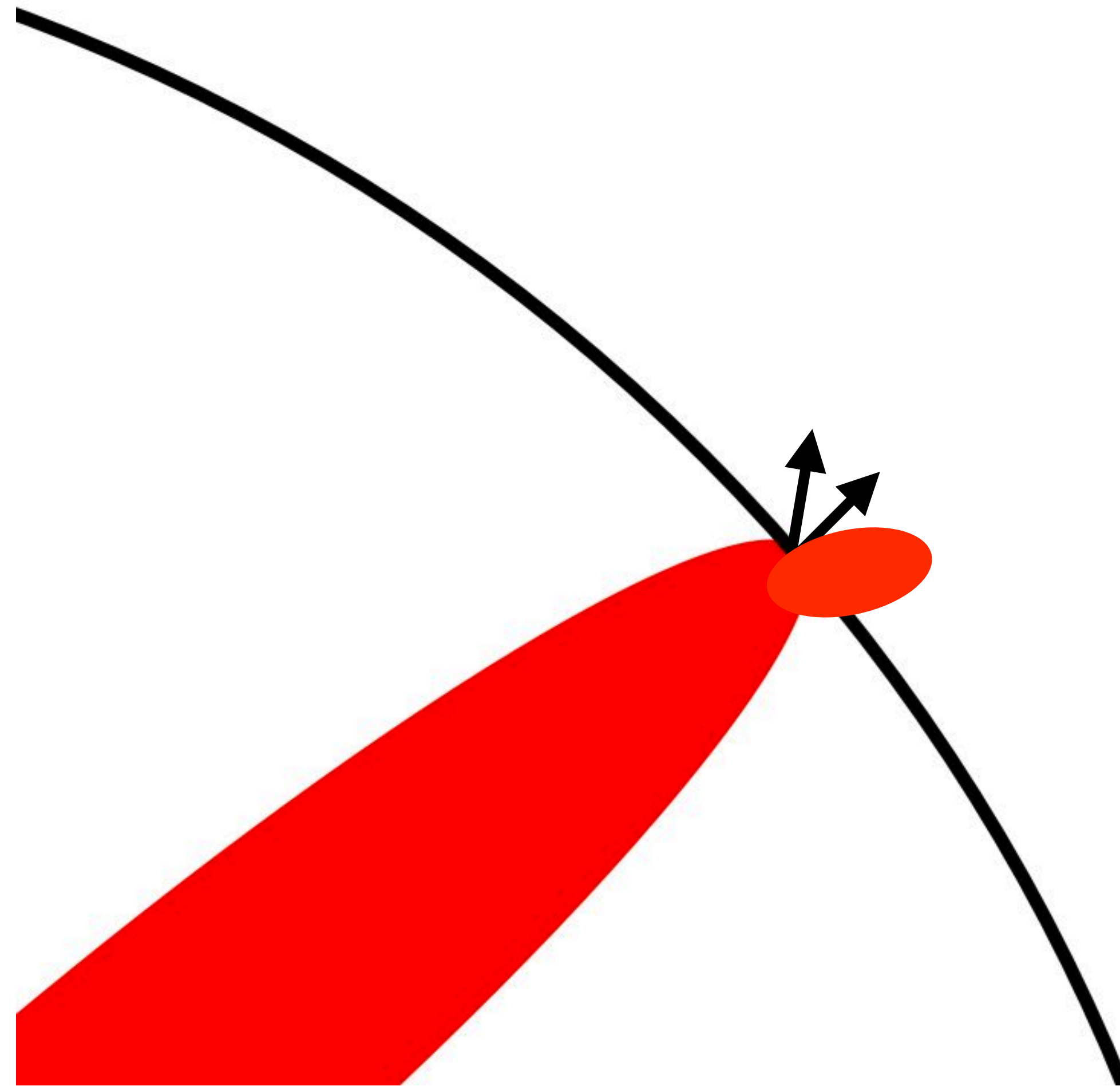
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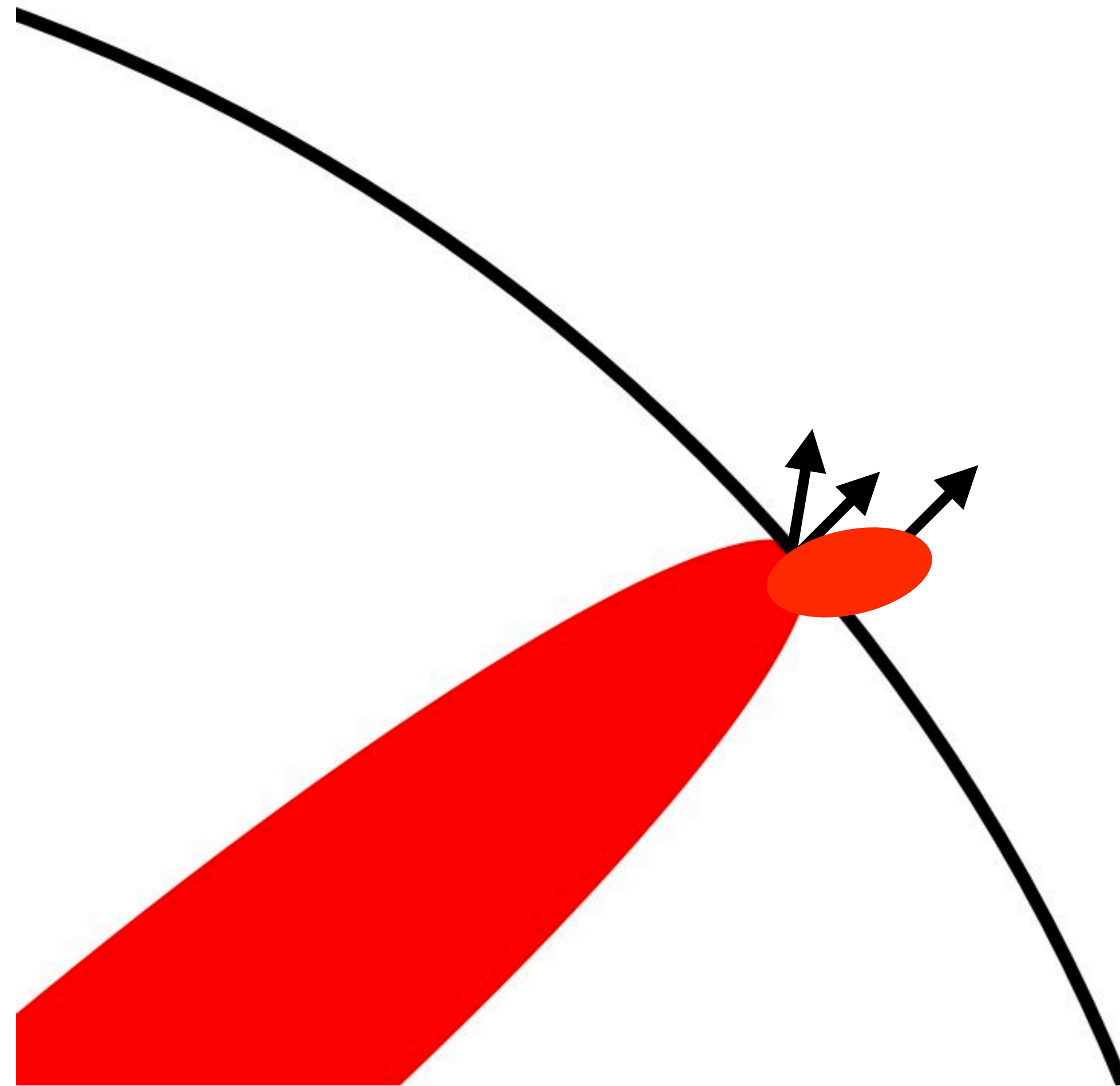
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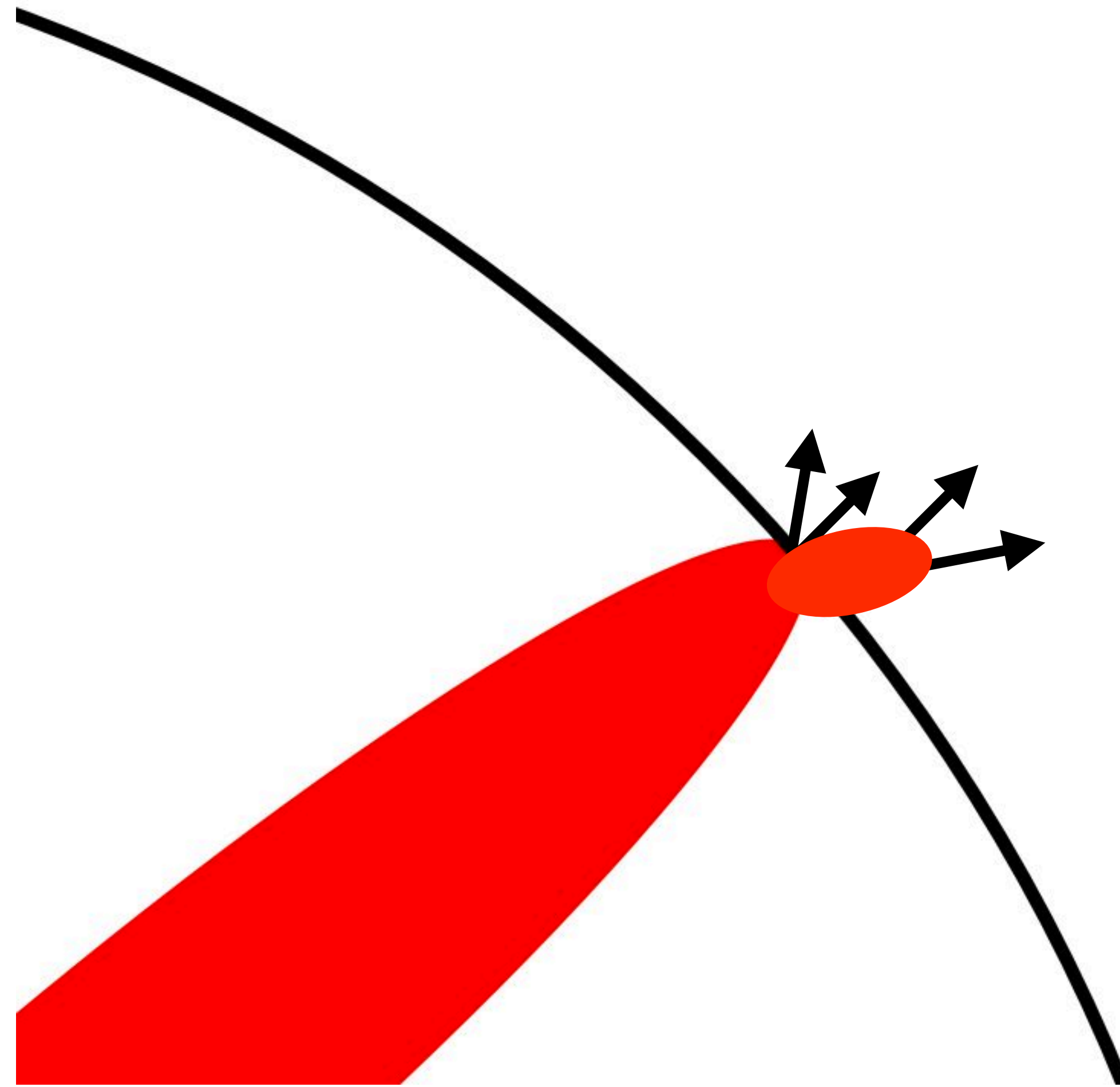
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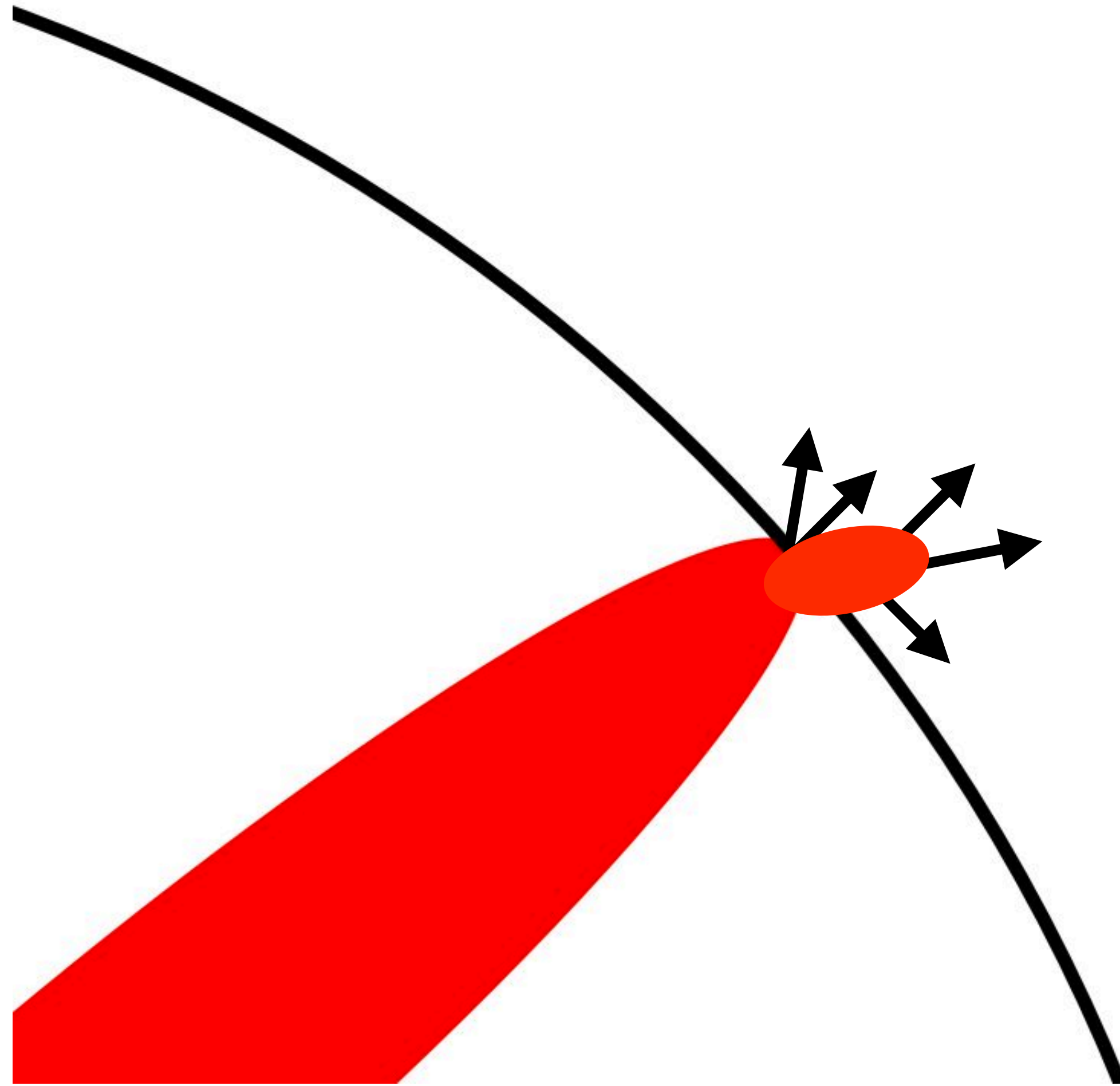
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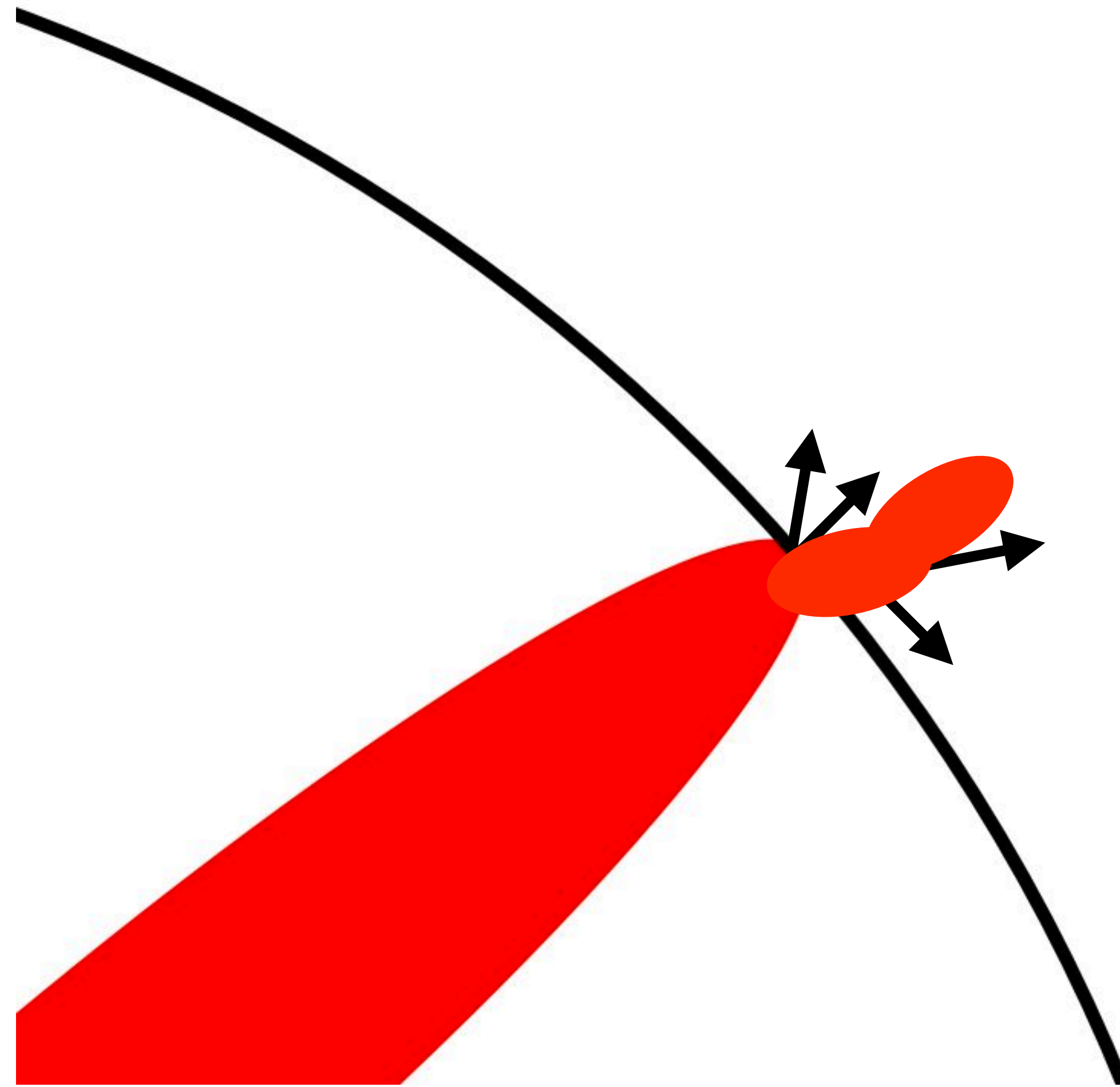
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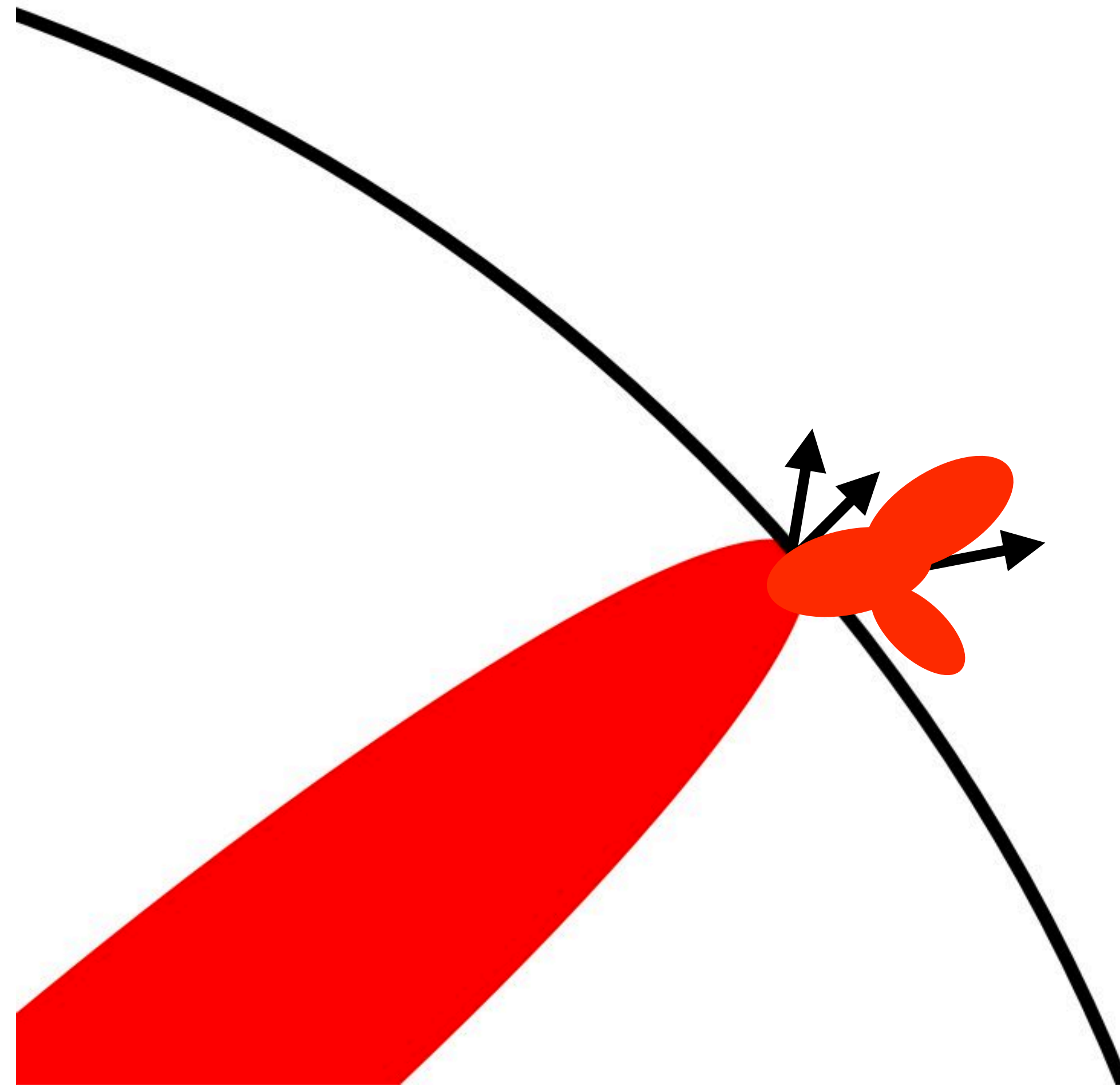
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Key components of NLP Systems

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Data

Examples of the language phenomena we want our system to handle

Key components of NLP Systems

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Examples of the language phenomena we want our system to handle

Model

A function that maps (input, output) pairs to scores

Key components of NLP Systems

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**Inference
Method**

A way to make a prediction for an example given a

Model

Key components of NLP Systems

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Learning
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A way to update a

Model

given

Data

and an

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A function that maps (input, output) pairs to scores

Inference
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A way to make a prediction for an example given a **Model**

Learning
Method

A way to update a **Model** given **Data** and an **Inference Method**

Evaluation

A way to measure quality of a **Model** + **Inference Method** given **Data**

Part 2: Recent Research

Data

Crowdsourcing methodology (NAACL 2019)

Model

Multi-Intent classification (draft), Slot relation extraction (draft)

Inference Method

Joint intent and slot prediction (ACL 2018)

Learning Method

Self-teaching (ACL 2019)

Evaluation

Metrics for evaluation (NAACL 2018)

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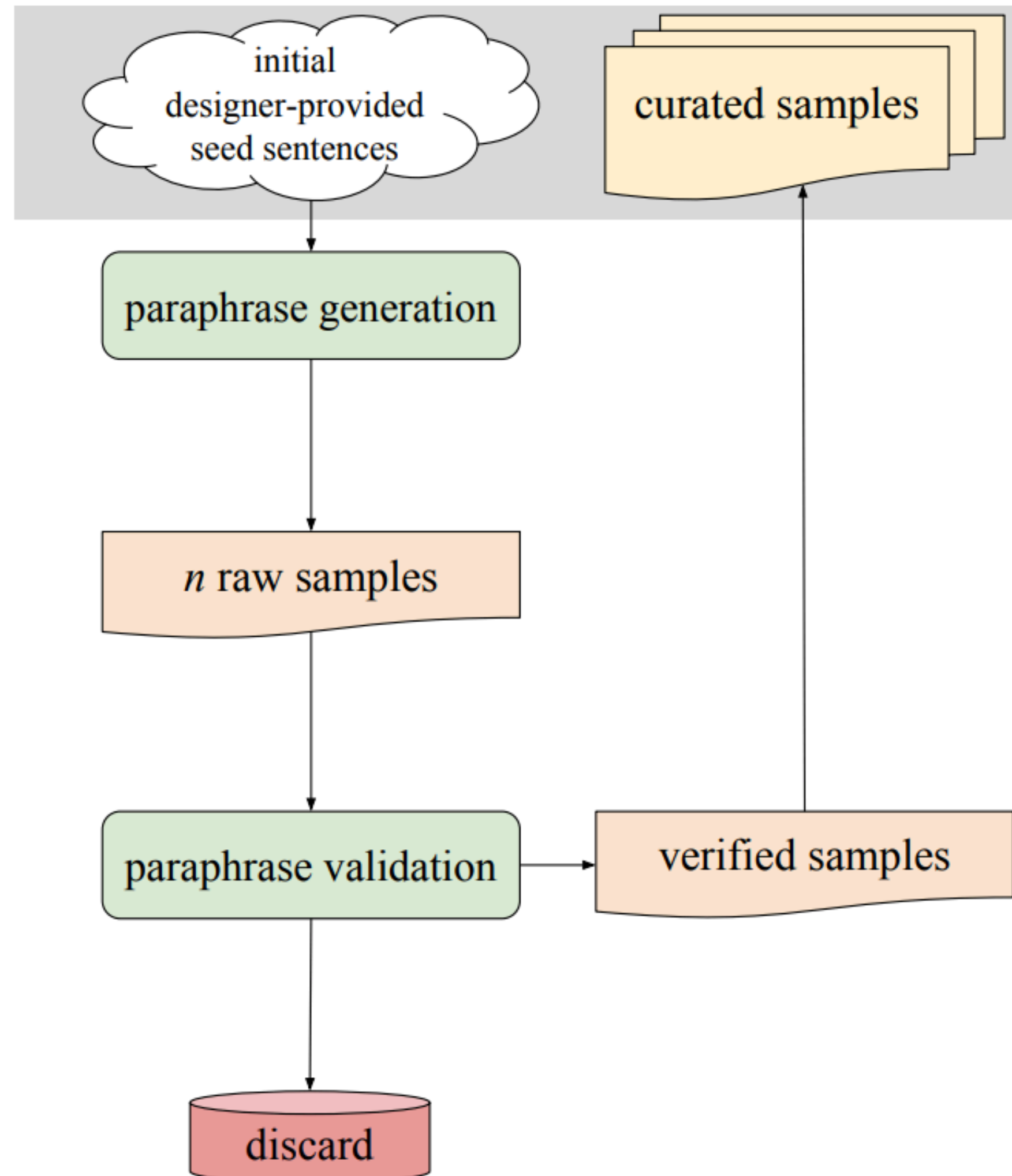
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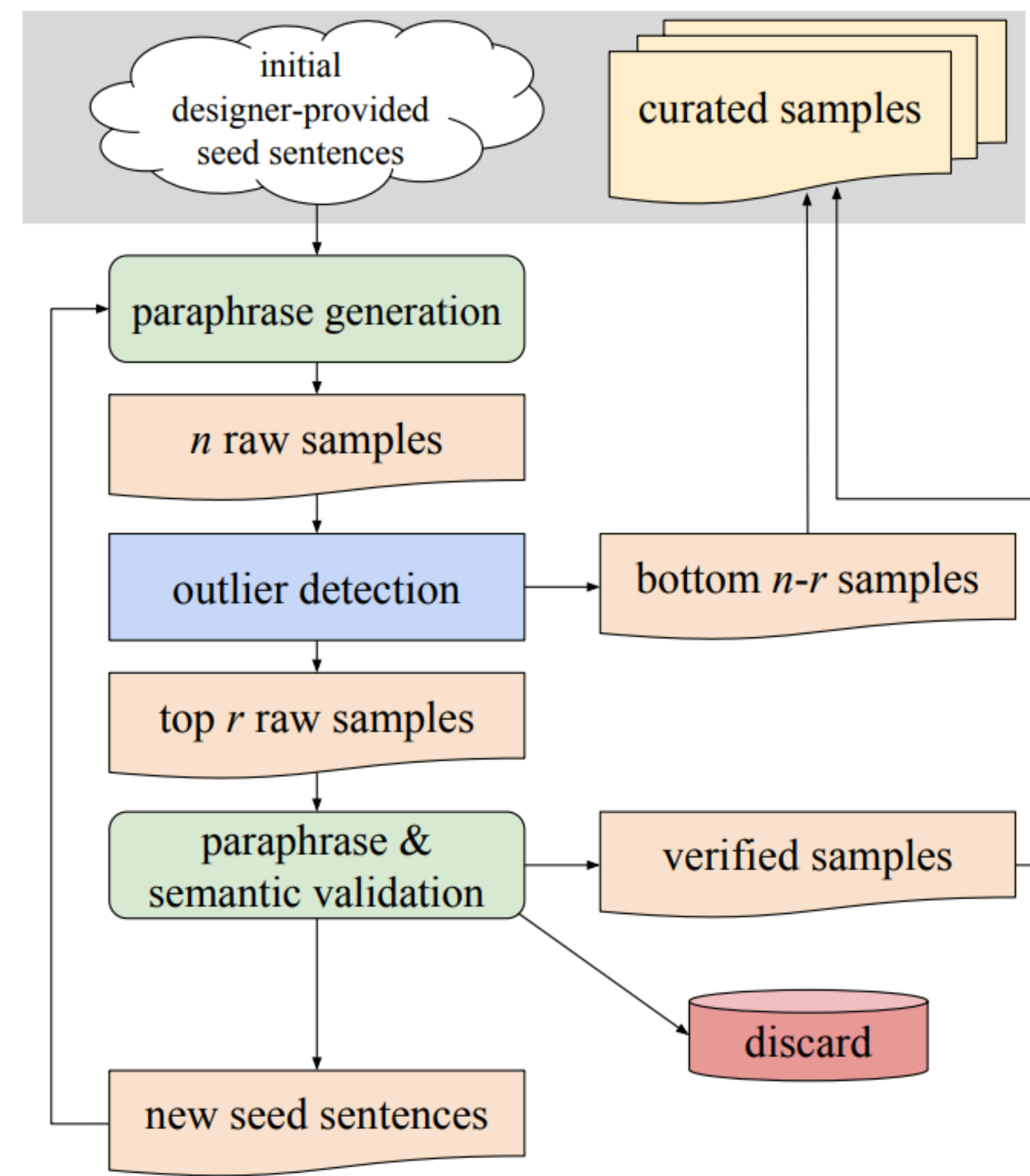
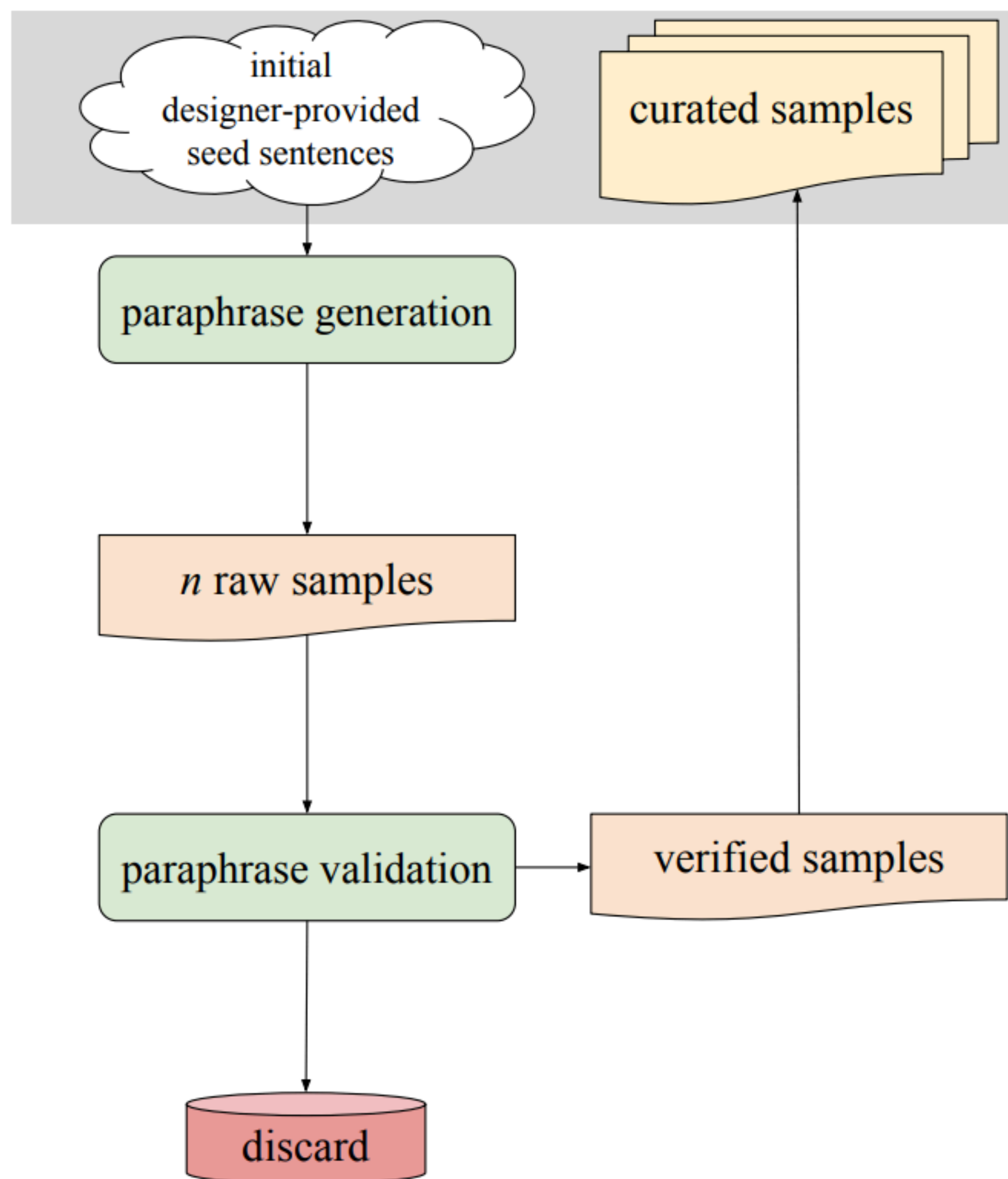
We can improve data quality by detecting outliers

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We can improve data quality by detecting outliers

Metric	Training	Test Set		
		same	random	unique
SVM Accuracy	same	0.99	0.97	0.81
	random	0.98	0.98	0.81
	unique	0.99	0.97	0.98

We can improve data quality by detecting outliers

Metric	Training	Test Set		
		same	random	unique
SVM Accuracy	same	0.99	0.97	0.81
	random	0.98	0.98	0.81
	unique	0.99	0.97	0.98
Slot F ₁	same	96.4	96.0	93.1
	random	96.4	96.8	93.6
	unique	96.7	96.5	94.9

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Multi-intent Classification

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Slot Relation Classification

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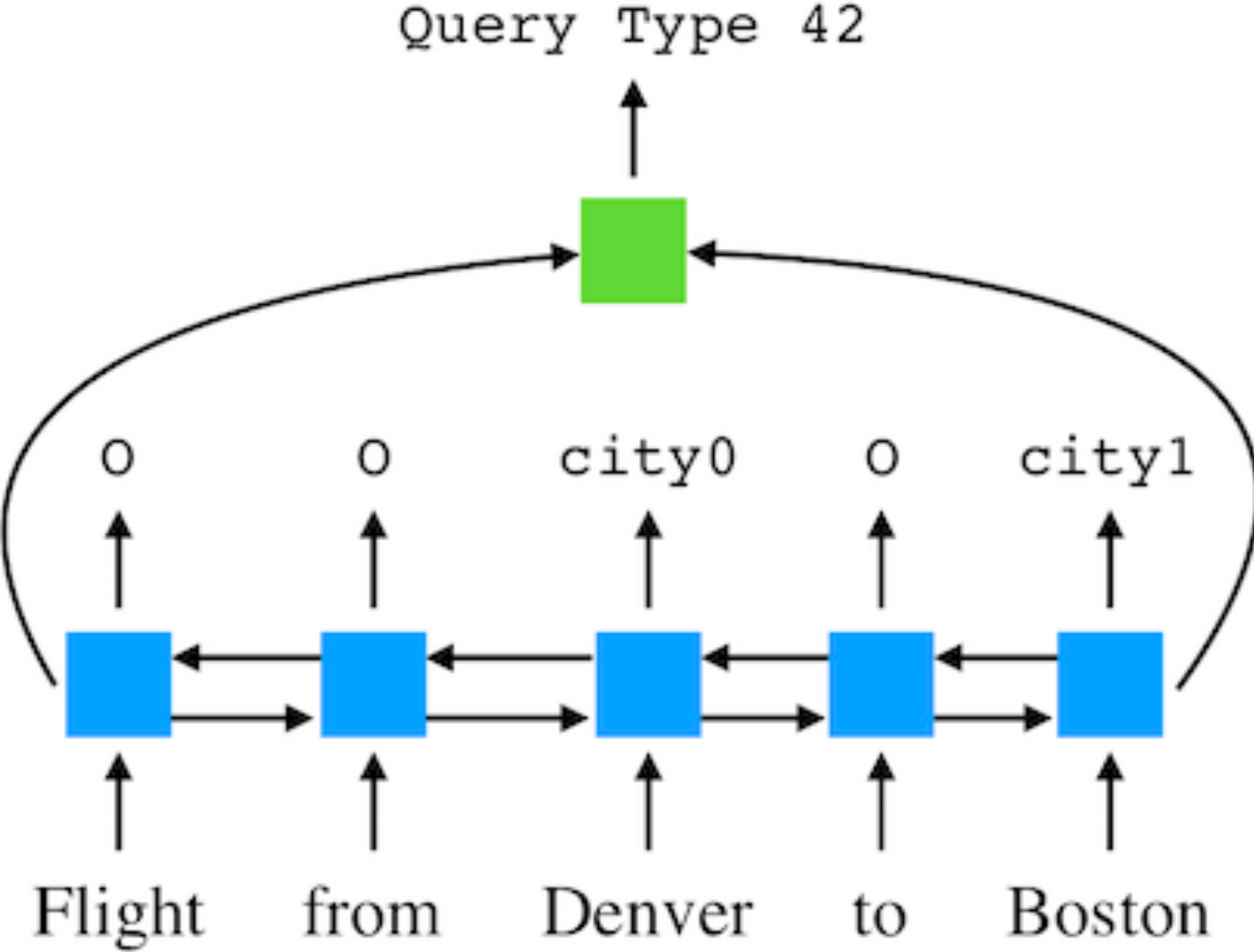
Metrics for evaluation (NAACL 2018)

Simultaneous intent classification and slot extraction

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Flight from Denver to Boston

Simultaneous intent classification and slot extraction



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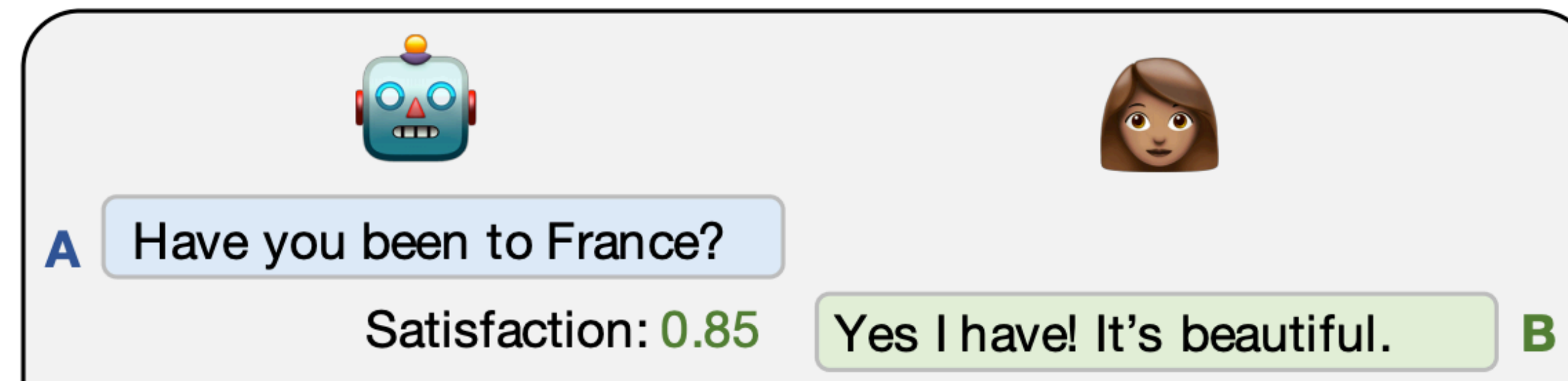
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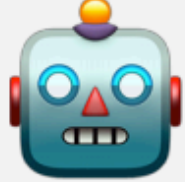
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“Learning from Dialogue after Deployment: Feed Yourself, Chatbot!”

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“Learning from Dialogue after Deployment: Feed Yourself, Chatbot!”



A  Have you been to France?
Satisfaction: 0.85

 Yes I have! It's beautiful. B

“Learning from Dialogue after Deployment: Feed Yourself, Chatbot!”



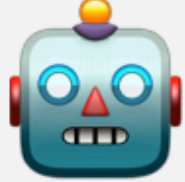

A Have you been to France?
Satisfaction: 0.85

Yes I have! It's beautiful. **B**

C Lol. I never eat them!
Satisfaction: 0.10

What are you talking about? **D**

“Learning from Dialogue after Deployment: Feed Yourself, Chatbot!”

A Have you been to France?
Satisfaction: 0.85

B Yes I have! It's beautiful.

C Lol. I never eat them!
Satisfaction: 0.10

D What are you talking about?

E Oops! I messed up.
What should I have said?

F Maybe ask me what I thought about French food?

“Learning from Dialogue after Deployment: Feed Yourself, Chatbot!”

Extracted Training Examples	
DIALOGUE	FEEDBACK
Context	Context
A Have you been to France?	A Have you been to France?
Response	Feedback
B Yes, I have! It's beautiful.	F Maybe ask me what I thought about French food?

A Have you been to France?
Satisfaction: 0.85

B Yes I have! It's beautiful.

C Lol. I never eat them!
Satisfaction: 0.10

D What are you talking about?

E Oops! I messed up. What should I have said?

F Maybe ask me what I thought about French food?

“Learning from Dialogue after Deployment: Feed Yourself, Chatbot!”

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Human-Bot (HB)		Human-Human (HH) DIALOGUE			
DIALOGUE	FEEDBACK	20k	40k	60k	131k
-	-	30.3 (0.6)	36.2 (0.4)	39.1 (0.5)	44.7 (0.4)
20k	-	32.7 (0.5)	37.5 (0.6)	40.2 (0.5)	45.5 (0.7)
40k	-	34.5 (0.5)	37.8 (0.6)	40.6 (0.6)	45.1 (0.6)
60k	-	35.4 (0.4)	37.9 (0.7)	40.2 (0.8)	45.0 (0.7)
-	20k	35.0 (0.5)	38.9 (0.3)	41.1 (0.5)	45.4 (0.8)
-	40k	36.7 (0.7)	39.4 (0.5)	41.8 (0.4)	45.7 (0.6)
-	60k	37.8 (0.6)	40.6 (0.5)	42.2 (0.7)	45.8 (0.7)
60k	60k	39.7 (0.6)	42.0 (0.6)	43.3 (0.7)	46.3 (0.8)

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Diversity

How much variation is there in your training data?

Coverage

How well does your training data represent the ways a question could be asked?

Template	Type	Accuracy			
		SVM	FastText	CVG	DIV
Scenario	Generic	68.49	69.70	0.30	0.90
	Specific	65.86	68.10	0.29	0.89
	Both	74.77	75.48	0.32	0.91
Paraphrase	Generic	68.60	70.50	0.30	0.88
	Specific	67.80	67.77	0.29	0.87
	Both	75.46	76.44	0.32	0.90

Thanks!

What questions do you have?