High precision study of antineutron and hyperons interact with nuclei at a future super J/ψ factory

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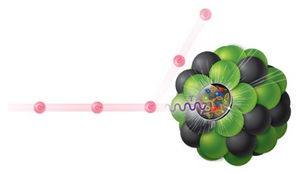
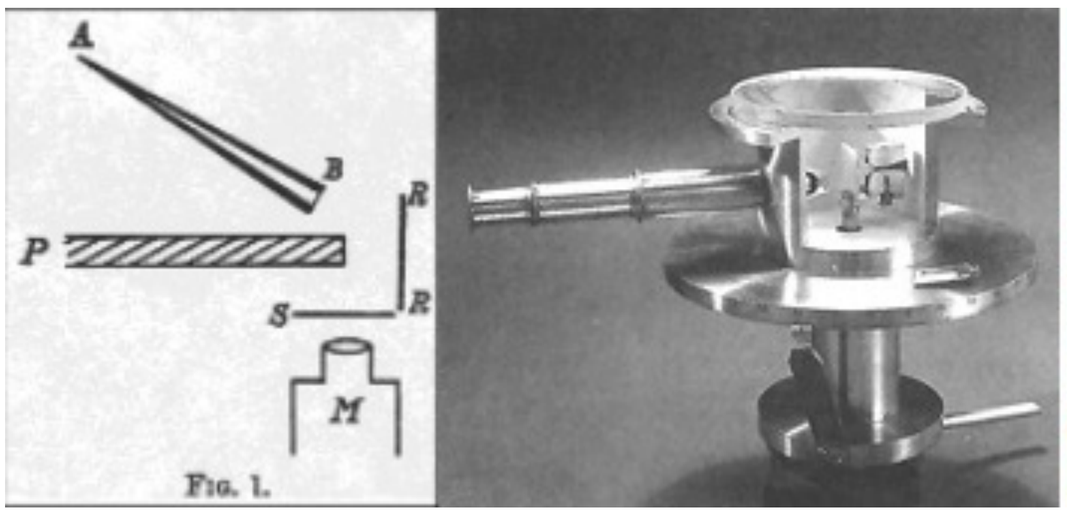
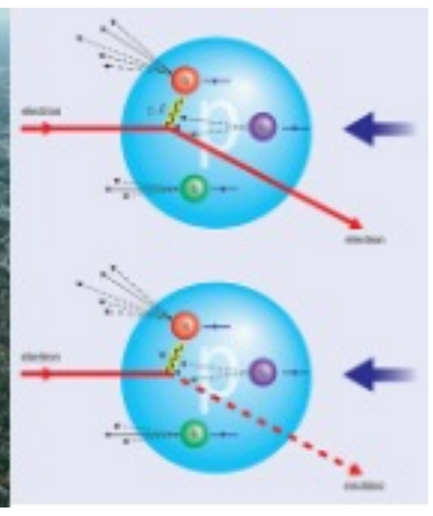
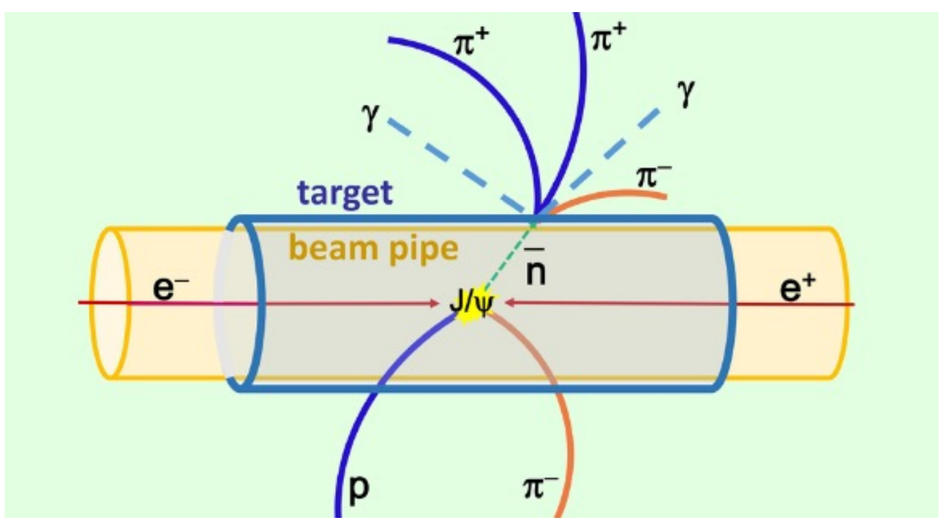


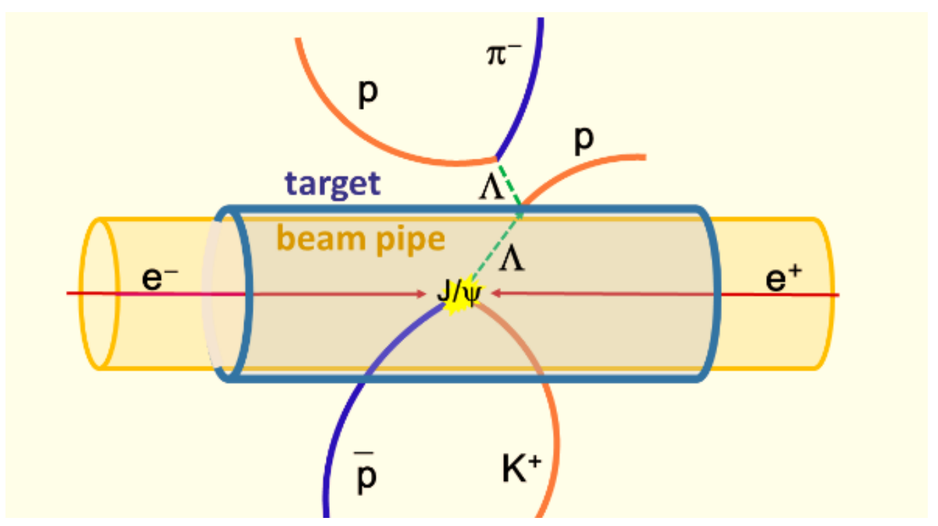
Scattering experiments are essential for investigating the fundamental interactions and structure of the matter, and the beams sources are indispensable for such experiments



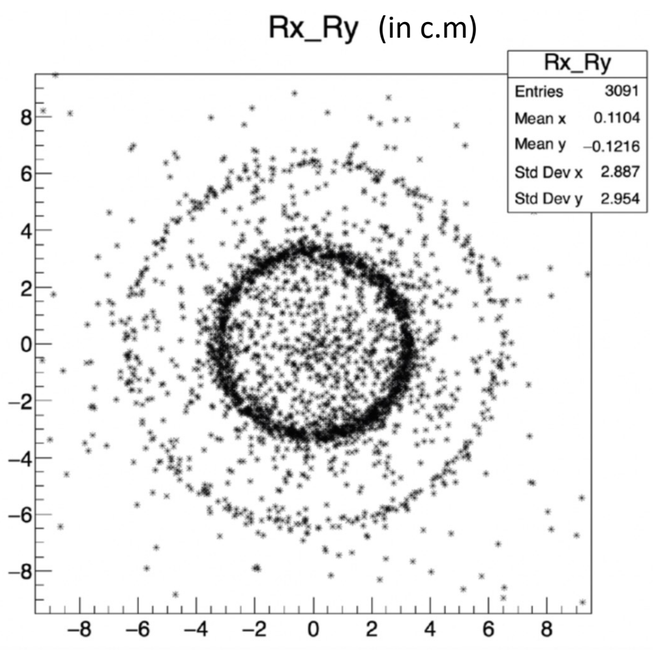


Antineutrons and hyperons are very difficult to produce and control, of which the statistics is low
New method is proposed: J/ψ decays, as shown by the two plots





Antineutrons and hyperons produced by proposed method are of clear signature and good resolution (left), and the statistics is large enough (right)



Reconstructed vetex postion

Baryon	$c\tau$/cm	Decay Mode	B_{tag}/%	ε_{tag}/%	$f^B_{1\,cm}$/%	$f^B_{2\,cm}$/%	$N^B_{1\,cm}$/(×10^6)	$N^B_{2\,cm}$/(×10^6)
$\bar{n}$	2.6×10^{13}	$J/\psi\to p\pi^-\bar{n}$	100	50	100	100	850	850
Λ	7.89	$J/\psi\to\bar{\Lambda}\Lambda$	64	40	76	65	370	310
		$J/\psi\to\bar{p}K^+\Lambda$	100		70	55	240	190
Σ^+	2.40	$J/\psi\to\bar{\Sigma}^-\Sigma^+$	52	40	49	27	150	84
		$J/\psi\to\bar{\Lambda}\pi^-\Sigma^+$	64		38	17	81	36
Σ^-	4.43	$J/\psi\to\bar{\Lambda}\pi^+\Sigma^-$	64	40	56	35	—	—
Ξ^0	8.71	$J/\psi\to\bar{\Xi}^0\Xi^0$	64	20	72	57	110	85
		$J/\psi\to\bar{\Xi}^+\pi^-\Xi^0$	64		66	49	—	—
Ξ^-	4.91	$J/\psi\to\bar{\Xi}^+\Xi^-$	64	20	60	40	74	50
		$J/\psi\to\bar{\Xi}^0\pi^+\Xi^-$	64		52	30	—	—
Ω^-	2.46	$\psi(2S)\to\bar{\Omega}^+\Omega^-$	44	20	31	11	1.4	0.5
		$\psi(2S)\to\bar{\Xi}^0K^+\Omega^-$	64		18	4	—	—

Estiamted statistics if 10^{12} J/ψ collected

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