

5.15 Progress Report on the Experiment "The Measurement of A_{nn} Parameter at Large P_T Region in the $p^\uparrow n^\uparrow \rightarrow pn$ Scattering"

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The characteristic behaviors seen in the A -parameter¹⁾ and A_{nn} -parameter²⁾ at the large P_T region in p - p elastic scattering suggest the possible existence of the special reaction mechanism in the very short distance collision. As shown in Fig. 1, both values start to increase at $P_T^2 \simeq 3.2$ (GeV)² and especially A_{nn} reaches to 0.6 at $P_T^2 = 5.0$ (GeV)². To understand this feature, it was proposed several models, i.e. optical model, Regge model, some kinds of quark models and so on. Among them the quark model based on the QCD seems to be most fascinating, because it can predict other processes, for example p - n elastic scattering, by using the nucleon wave function consisted of quark combinations. In Table 1, the predictions by three kinds of quark models are presented concerning p - p and p - n processes. On the A -parameter, a summary is reported elsewhere³⁾.

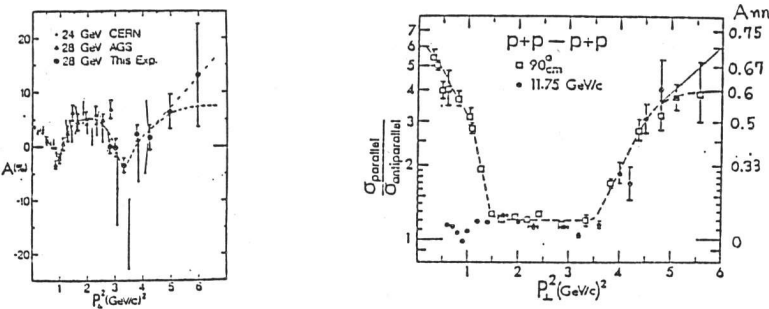


Fig. 1
Asymmetry and
spin correlation
parameters in pp
elastic scattering.

Model	p-p	p-n	$(d\sigma/dt)^{np}/(d\sigma/dt)^{pp}$
QIM	$A_{nn} = -A_{\ell\ell} = -A_{ss}$	$A_{nn} = -A_{\ell\ell} = -A_{ss}$	
(Farrar et al.)	$A_{nn}(90^\circ) = 1/3$	$A_{nn}(90^\circ) = -0.44$	~ 0.6
(Brodsky et al.)			
Di-quark spectator model (Wolters)		$A_{nn} = -0.22 \pm 0.22$	
Q-Q scattering model (Chen)	$A_{nn} = \begin{cases} 1/9 & \text{with color} \\ -1/11 & \text{without color} \end{cases}$	$A_{nn} = 0$	

Tabel 1 The predictions of A_{nn} by several quark models.

